THE GARDEN JOURNAL

OF THE NEW YORK BOTANICAL GARDEN

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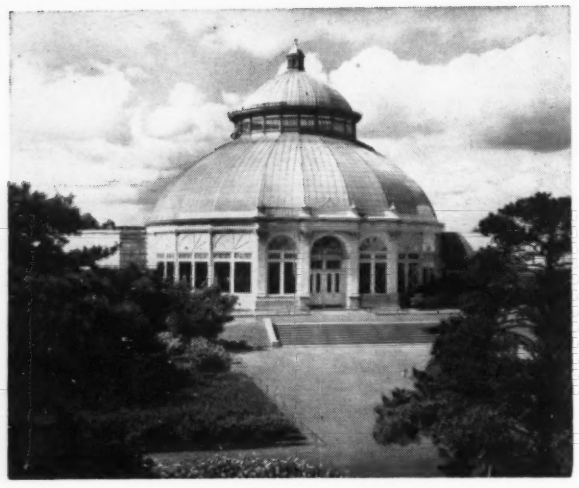

Christmas House Show, December 4, 1957.

Christmas Show in Conservatory, December 13, 1957-January 10, 1958.

Theater Benefit, January 8, 1958.

Morning Lecture Series, January 9, 16, 23, 30, 1958.

Annual Members' Day, February 6, 1958.

Free Saturday Afternoon Lectures, Winter-Spring 1958—first lecture, January 4, 1958.

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THE GARDEN JOURNAL

of The New York Botanical Garden

DOROTHY EBEL HANSELL
Editor

CONTENTS

November - December, 1957

"Botany for Gardeners"	*Harold W. Rickett*	177
The Better Lilacs	*Clyde H. Heard*	180
Today's Better Perennials	*Roderick Cumming*	181
Outdoor Chrysanthemum Culture	*Spencer Harrison Capreal*	184
Asiatic Crabapples — Dual Purpose Ornamentals	*R. D. Anthony*	187
John Bartram and "Thorndon Park"	*Winifred Notman Prince*	189
Winter Protection of Plants	*T. H. Everett*	193
"Men and Gardens"—A Review	*Harold W. Rickett*	197
September Patterns at Greenbrook	*Harold W. Swift*	198
The Editor Visits—"Mount Vernon;" "Dumbarton Oaks;" Other Gardens	*Dorothy E. Hansell*	202
Book Reviews		206
News, Notes and Comments		209
Let There Be Herbs	*Gertrude B. Foster*	211

AMONG OUR CONTRIBUTORS

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"Botany for Gardeners"

By **Harold W. Rickett**

The excerpts from the chapters on "Flowers" from Botany for Gardeners, 1957, are reprinted in these columns with permission of the author and of the publisher, The Macmillan Company, New York. —The Editor.

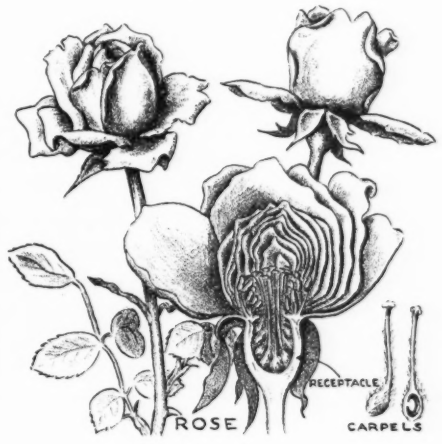
The Essential Parts

PART OF THE FASCINATION of flowers is their infinite variety. Perhaps we think first of the showy flowers — iris, daffodils, lilies, roses, dahlias, orchids: flaunting their many lovely colors, their delicate perfumes, their graceful forms. But there are flowers which have no such attractions, which are minute, scarcely to be seen without a magnifier. Grasses and sedges and rushes have flowers, and oaks and elms and alders and willows, and duckweed; and all these form fruit, too. There are also the unattractive little greenish flowers of ragweed, responsible for much human suffering. There are flowers that smell like a skunk, and others with the odor of putrid flesh. Yet all these various things are alike in plan: they all have the same parts, in spite of all the differences in size, shape, color, odor. They are all alike also in their essential functions: they all perpetuate their species, they all form fruits which contain seeds, and they all form these things in much the same way. The only exceptions to this statement are some of the things we have bred for our gardens, which are for show only and of no use to the plants which bear them: most peonies, dahlias, flowering cherries, and others. These are propagated by their vegetative parts.

In external form and appearance flowers are certainly so various that it is difficult to know how to begin a description of them, to find a formula which will fit them all. Most flowers are small, too small for a beginning study. For first inquiry it is best to choose the largest flower that we can find: say a magnolia. We enjoy these for the beautiful display they make in the spring, mantling their trees with pink and white petals; we need no botanical instruction to know that much. But what the botanist knows as the "essential" parts of the flower play a small part in this brilliant and lovely exhibition. If you look more closely than usual at a single magnolia flower, you will see in the center of it a sort of column; its base is surrounded by many narrow spreading things tinged with red or gold; its upper part is covered with small, curved, greenish projections; *these* are the essential parts, the reproductive parts, the parts that give the flower meaning in the economy of the species.

The spreading things at the base of the column, shaped like short ribbons or straps, are the stamens.[1] Since the time of Linnaeus these have been recognized as the male parts of the plant; though they cannot be strictly compared with any parts of animals. They form pollen, a fine dust.[2] This is the fertilizing agent; but it is not the same as the animal sperm.

The stamens spring from the base of the central column of the flower. On its upper part, close-packed, are borne the female parts, named carpels.[3] Each carpel is shaped rather like a long teardrop, with the narrow upper end bent. The lower, larger end contains in an interior cavity a minute body, or two: the future seeds. The early botanists, who were too anxious to find in plants the same female parts as they recognized in animals, called the lower part of the carpel the ovary and the rudimentary seed within it the ovule. The comparison was a mistaken one, for the ovule is not, as the name would indicate, a small egg; nor does any part of the carpel correspond to the ovary of an animal; but the names have stuck. The slender part of the carpel above the ovary bears aloft a small sticky part which catches and holds the fertilizing dust, the pollen. The slender part is the style, the receptive region the stigma.[4] In a magnolia flower the two are not clearly separate; the stigma extends down one side of the style. In other flowers the stigma is a more definite part carried at the extreme tip of the style.



These parts are surrounded by the beautifully colored and often fragrant leaves generally known as petals. There are two circles, or whorls, of these; the botanist restricts the use of the word petal to the inner whorl, calling the outer whorl sepals; although they all look alike. If we are impatient of such distinctions, we can use the word perianth[5] for all of them together. All the parts of the flower are attached to that central axis already noticed: the perianth at its base, where it is thickest; the stamens just above the perianth, in a spiral arrangement; and the carpels on the rest, also arranged in a spiral. The axis is the end of the stem which bears the flower; it is termed the receptacle.

Such is the fundamental plan of a flower: a receptacle which bears a

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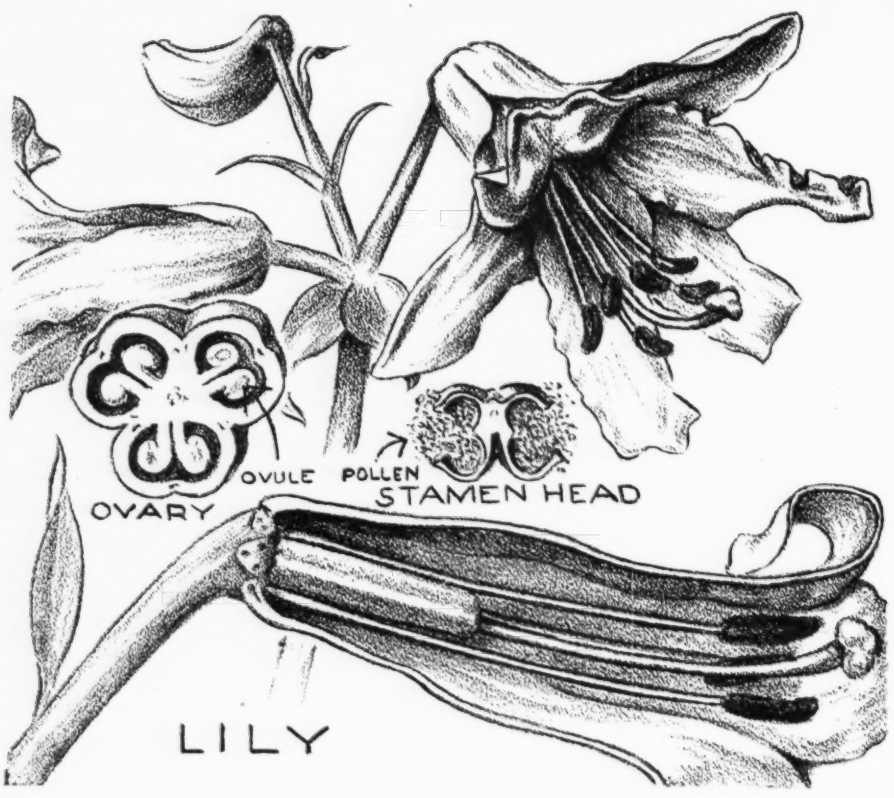
1 From a Greek word meaning "hair" or "thread"; those of most flowers have thread-like stalks.

2 That is the literal meaning of the Greek word: "dust."

3 From **karpos**, Greek, meaning "fruit"; as will be seen, the matured carpel is the nucleus of the fruit.

4 "Style" is from a word meaning "column." The Greek word **stigma** means literally "mark," "brand."

5 **Peri-** in Greek means "around," as in "periphery," "perimeter"; **anthos** means "flower" (compare "anthology"); so "perianth" means "around the flower"; the outer part of the flower.



perianth, stamens, and carpels. One or more of these parts may be lacking; other parts may be present. But whatever the flower, whatever its complexity and superficial peculiarities, the parts that are present bear the same relation to each other as in a magnolia: carpels on the apex of the receptacle, in the center of the flower; stamens below or around the carpels; and perianth around them in turn.

The functioning of these parts may be briefly outlined here, and dealt with more fully in the following pages. The pollen is carried by wind, insects, or other agents to the stigma. Here it sends forth long, living threads — the pollen tubes—which penetrate the style and reach the ovary, fertilizing the ovules. The ovary becomes the fruit, or at least the essential part of the fruit; the ovules develop into the seeds. The perianth plays some part, usually, in the distribution of the pollen, and then withers away and is lost. The fruit splits open, or is eaten by animals, or is wafted away on the breeze; in one way or another it delivers its freight of seeds to the earth which awaits them; they germinate, and a new generation —of magnolias or maples or apples or beans—is launched.

Lilies and Roses

Even casual examination of a magnolia flower (particularly if it is split lengthwise through its middle) reveals an arrangement of parts which recalls that of a leaf-bud at the tip of a growing stem. A leaf-bud consists of a stem-tip crowned by a cluster of closely overlapping leaves. This, in fact, is also the classical concept of a flower; the floral parts are considered to be leaves, of different kinds. It is not difficult to compare the perianth with leaves; its parts are shaped, if not always colored, like leaves. The stamens and carpels are less leaflike in appearance; but there are reasons[6] for regarding them as leaves. The central axis, the receptacle, has the internal structure of a stem; there is no doubt of its identity; and it forms the flower-parts in much the same way as an ordinary stem forms its leaves, at its growing tip. The striking difference between a flower-bud and a leaf-bud is that the latter normally continues to grow longer, while a flower-bud does not—it all matures in the act of forming the floral parts and there is no part left to prolong the growth of the stem.[7] The floral "leaves" remain bunched at the tip of the stem, where they are formed; not scattered along the side of a branch, as foliage leaves are.

If you have no magnolia at hand but do have a lily or an apple blossom or a daffodil or a crocus or a skunk cabbage or a tomato flower or a dahlia or a dandelion—you will be at first puzzled at not finding an arrangement like that described in the preceding pages. *Actually the plan of these various flowers is the same,* even though it cannot be discerned at first sight. The colored petals are present in most of them; there is certainly a perianth; but the stamens and carpels are not on a projecting axis in the center.

The sort of flower we see on a magnolia, generally considered by botanists an ancient type, the sort of flower from which others have been evolved, is not very common. It is seen also in a buttercup (the wild kind, not the "double" flower of the garden) and in an anemone. The curious little wild flower called mousetail has an even longer receptacle—a long scaly tail arising from a circle of tiny petals. But the great majority of flowers have a short, flat receptacle, with all the floral parts arising at about the same level. And many have a cup-shaped receptacle—hollowed out instead of projecting—with carpels in the center of the cup, other parts on the rim. Moreover in most flowers the parts are less numerous than in a magnolia, and arranged in circles or whorls instead of in a spiral.

Consider a lily. One of the obvious things about it is that there are just six parts to the perianth, three outer and three inner[8]; and six stamens. Not only are the parts less numerous than in a magnolia or a buttercup flower; they are fixed in number. In the middle, surrounded by the stamens, is what looks like a single large carpel: much larger than a carpel of magnolia, but having the same general outline—ovary at the base, style and stigma above. If you cut across this ovary you will find not one internal cavity but three; each containing the rudiments of many seeds. This thing in the center of the flower is

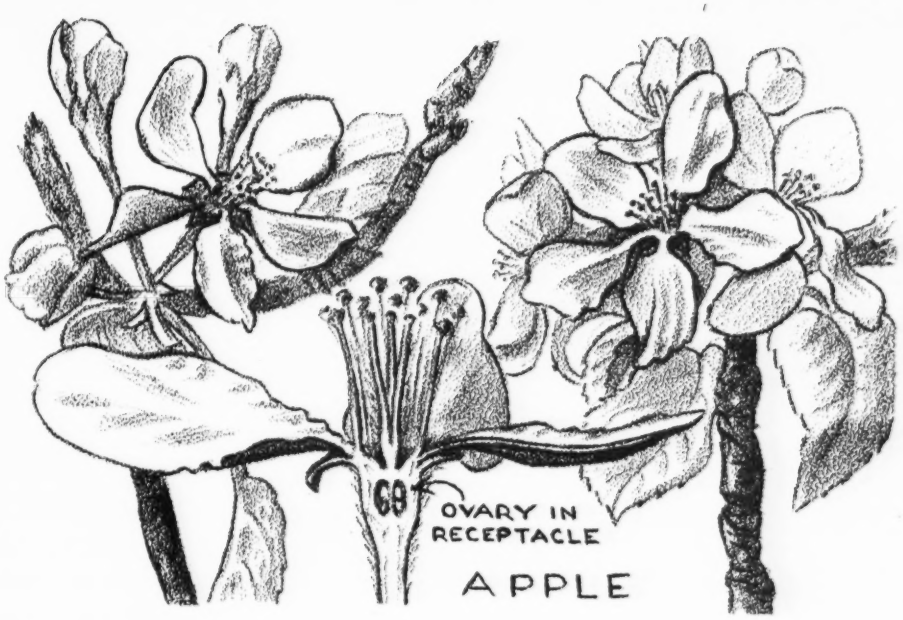
6 Unfortunately not regarded as conclusive by all botanists; this subject is still somewhat controversial.

7 Except for some freaks, in which a tuft of green leaves grows from the center of the flower.

8 The three outer ones may be likened to sepals, the three inner to petals; but since they are all colored and shaped alike, or nearly so, this distinction is not usually made.

actually made of *three carpels united* side by side. Another indication of its compound nature is seen in the stigma, which has three lobes.

Long ago, before botanists had any very clear idea of the structure or functions of a flower, they devised more or less fanciful names for the parts which they saw. This thing in the middle they called a pestle, because it resembles in shape the implement with which a chemist compounds medicines and other mixtures in his mortar. The Latin form of this word is *pistillum*; and, since learned people wrote and spoke in Latin, this form, slightly modified, has come down to us as the name of the part in question: we call it a pistil. This name is applied regardless of whether the body is made of a single carpel or of several united, and whether there are many such bodies or only one. A pistil is simply a body formed of an ovary containing an ovule or ovules and surmounted by a style and stigma.[9] A magnolia or buttercup or columbine has many *simple* pistils, each formed of one carpel. A cherry or sweet pea has one simple pistil. A simple pistil is the same as a carpel. A lily has a *compound* pistil, formed of three carpels joined. The pistil of a snapdragon has two carpels, that of a geranium five. But simple pistils and compound pistils have much the same external shape.



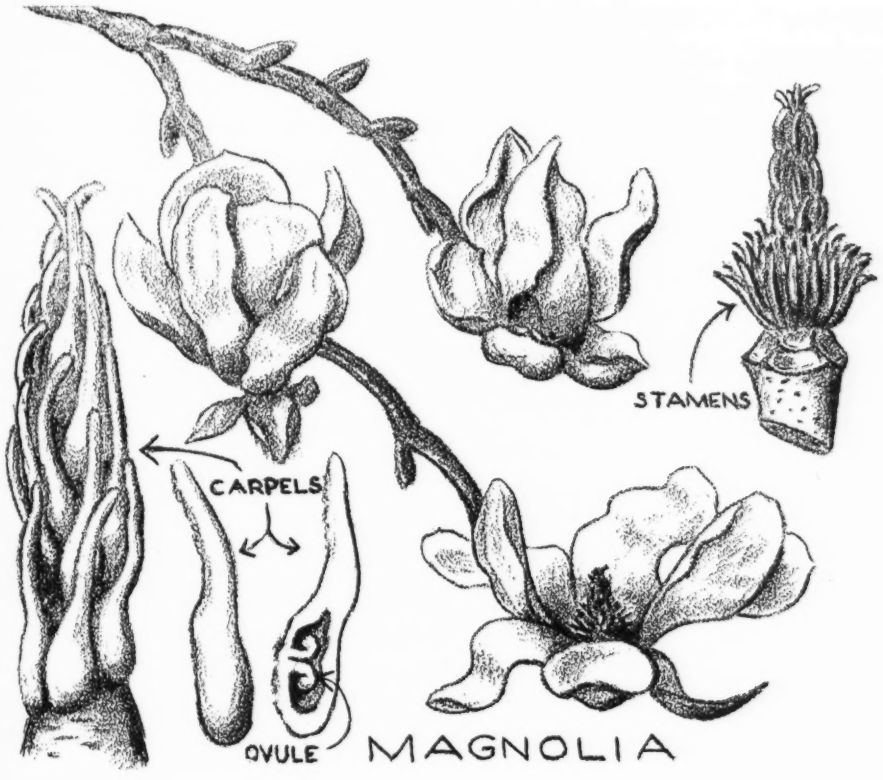
All the parts of a lily flower arise from a small flat surface, the slightly expanded end of the stem; this is the receptacle.

In Christian symbolism the lily has always represented chastity. The blood of martyrdom was represented by the rose. "These two noble flowers" (as one old poet has it) were so associated in religious ritual and art that to speak of one was to call the other to mind; and—such is the force of our traditions—this is still true.

A rose resembles a magnolia or buttercup in having large indefinite numbers of stamens and carpels, the latter forming many simple pistils. But the receptacle, the end of the stem, is expanded and hollowed out; it is like a cup or urn.[10] The interior is lined with many small downy pistils, their styles rising enough so that their stigmas project through the opening of the cup—and often fill it. Stamens stand around the rim, a crowd of them. There are usually, in the wild roses, five petals and five sepals, all composing the perianth; here we have a clear distinction between the fragrant and brilliant petals and the green, more or less leaflike sepals. The petals of any flower are collectively known as the corolla, the "little crown" and the sepals as the calyx, the "covering."

The roses of our gardens illustrate one way in which flowers have become

(Continued on page 205)



9 The style is lacking in some flowers; in a tulip the stigma is seated on the summit of the ovary.

10 Recent researches indicate that this cup, which is better termed the hypanthium (meaning literally "under the flower"), is at least in many flowers formed of the basal parts of perianth and stamens, all grown together; rather than of the end of the stem to which all these are attached. It does not greatly matter; the point is that growth from the tip of the stem takes this form—it rises in a ring below the apex instead of in a column at the apex. There is reason to think that in a rose the structure is partly stem and partly the united bases of the floral leaves. For the purposes of elementary discussion the term receptacle may be used to designate the structure from which the parts of the flower seem to spring, whatever its true morphological nature.

The Better

LILACS

By Clyde H. Heard

Based on a talk given before the conference of Iowa Nurserymen at Iowa State College in February 1957.

SYRINGA, the botanical name for the lilac, comes from a Greek word meaning shepherd's pipe or flute. Stems of the finest Turkish pipes were manufactured from the wood of this shrub.

Syringa amurensis, pekinensis, and *japonica* are large growing varieties which probably came from Korea, Manchuria, and Japan. They were introduced into Russia about 1857. *Japonica* was received by the Arnold Arboretum in 1876. *Syringa oblata* was brought from North China to England in 1856 by Robert Fortune. The Persian lilac, formerly thought to be of Persian origin, is of Chinese origin; it occurred wild in Kansu, China. Lilacs were favorite plants among the Asiatic peoples.

The common lilac, *Syringa vulgaris,* probably a native of southeastern Europe, was first mentioned by Pierre Belon in 1554. It appeared in England in the seventeenth century but was in Vienna, Austria, as early as 1563 and supposedly came from Constantinople (Istanbul to you), Turkey.

A natural cross between the Persian lilac, *Syringa persica,* and *S. vulgaris,* produced the Chinese lilac, *Syringa chinensis,* commonly called *rothomagensis* or Rouen lilac and erroneously still called Persian. It occurred in the botanical gardens in Rouen, France, about 1777. It is a much better lilac in most respects than the Persian—better foliage, more rugged in its growth, and a better bloomer. It is the best of the hedge lilacs today.

Syringa pubescens and *Syringa microphylla* are natives of China. The former is the most fragrant lilac I know of but has little else to recommend it, and is hard to propagate. The latter is called the "little leaf lilac."

The first common lilacs *(Syringa vulgaris)* in the United States, according to J. Templeton Coolidge, were probably on the Governor Benning Wentworth mansion grounds in Portsmouth, New Hampshire, about the year 1750. (The lilac, by the way, is the state flower of New Hampshire.) In Thomas Jefferson's garden records of April 2, 1767, he mentioned planting lilacs; George Washington, in his diary, also mentions planting lilacs. The gardens of Colonel Custis are said to have contained one of the best lilac collections, and Washington probably obtained his lilacs from Col. Custis, his father-in-law. The lilacs of all these gentlemen were limited almost entirely to whites, lavenders, and blues.

William Prince listed lilacs in a nursery catalogue in 1823. In his catalogue of 1841, he listed 272 varieties of apples, 420 of pears, 109 cherries, 156 plums, 116 grapes, 147 gooseberries, 196 varieties of ornamental trees, 273 shrubs, 111 evergreens, 73 vines, 680 roses, 85 culinary herbs, and 800 perennial flowers. The large wholesale nurseries of today are "pikers" compared with Prince, and I, who make a hobby of growing lilacs, could not even qualify.

Some twenty-five or thirty years ago, I had what I thought was a rather good collection of lilacs. The fourteen varieties were 'Alphonse Lavallee,' 'Belle de Nancy,' 'Charles Joly,' 'Marie Legraye,' 'Mme. Lemoine,' 'Jules Simon,' 'Mme. Leon Simon,' 'Marechal de Bassompierre,' 'Michel Buchner,' 'President Grevy,' 'Rubra de Marley,' 'Ludwig Spaeth,' 'William Robinson,' and 'La Tour d'Auvergne.' Several customers urged me to visit a private collection owned by Miss Vivian Evans on her farm near Booneville, Iowa. "You have some nice lilacs but we believe that hers are a lot better." After listening to this remark several times, Mrs. Heard and I finally looked over Miss Evans' collection of some three hundred varieties. After checking the collection two or three times during the blossoming season for about eight years, and also the collection in Ewing Park (one hundred and fifteen of the best varieties in Ewing Park came from the Evans collection) several times, we began to observe that certain varieties were standouts. Unfortunately, the Evans collection had to be discontinued because of the difficulty in getting labor during the war years and because of the illness of Miss Evans' mother and a disastrous fire which destroyed the farm home. Miss Evans' valuable advice saved me from wasting time with substandard varieties. She is undoubtedly one of the best posted persons on lilacs in the United States today. Her copy of THE LILAC by Susan McKelvey, has had more hard usage than any other I have seen. If a variety was off color, single instead of double, had some peculiarity in the florets or some other detail, she would buy another from a different source for comparison. Miss Evans richly deserved the honor award she received from the Iowa State Horticultural Society a couple of years ago.

The next real boost I received was the publication of the first edition of LILACS FOR AMERICA, which came out in April, 1942. Of the fourteen varieties I had in the beginning, two were rated below 5; five between 5 and 6; six between 6 and 7; and only one had a rating of 7 on the basis of 10 for perfection. 'Rubra de Marley,' rated 4.3, and 'La Tour d'Auvergne,' rated 4.5, were the poorest. Nine were rated in the top one hundred lilacs, but they were low in their color brackets. Most of these have since been discarded. My best lilacs have come from the Evans collection, the smaller Luthe collection, the Arthur Hoyt Scott Foundation at Swarthmore College, Morton Arboretum, Brand's, and some of the Canadian introductions.

I have had considerable trouble in securing some varieties true to name—it required three attempts to get 'Violetta.' I bought twenty of 'President Lincoln' from an unusually reliable source, but they proved to be not true to name, and I had to replace twenty-three or twenty-four specimens of 'President Lincoln' before all the 'President Lincoln' customers were satisfied. Now I have one of the Canadian hybrids under trial which is single when it should be double; it has no pride in its ancestry, as far as I am concerned.

I prefer the term "hybrid lilacs" instead of "French hybrids," because many of our best lilacs are not of French origin. One of the best of the deep purples, 'Ludwig Spaeth,' is of German origin, and there are excellent varieties of American origin. 'Charm' and 'Glory' are two of these. Belgium, Holland, and Canada are also well represented in hybrid lilacs. Several originators have introduced far too many varieties which

(Continued on page 201)

TODAY'S BETTER PERENNIALS

By **Roderick Cumming**

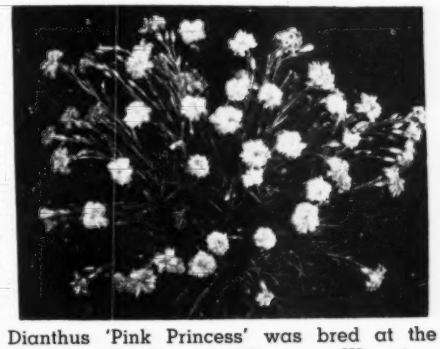
THESE NOTES, having been prepared in late July, are perhaps tainted with a jaundiced view against plants unable to cope with dry weather. At that time, Connecticut was still groggily jousting with its most relentless drought in recent history. Only five inches of rain had fallen since April!

Plants in general, perennials in particular, have subsisted only on irrigation of one form or another. As water supplies began to dwindle alarmingly, so did the zeal of many sincere gardeners. In any case, irrigation supplies only a grudging foothold on life to harassed roots; it simply cannot provide that animated, flower-laden lushness we all cherish. Only regular periods of dark, moist days, refreshing nights, and morning's "sparkling dewdrops" can assure an air of well-being.

Therefore, a number of normally first-rate perennials have been stunned into listless mediocrity this year. Conversely, others seemed to have taken a wicked pleasure in constant aridity, but could prove scantier of blossom under easier living.

One should learn — but probably never will — not to go overboard on a new perennial without at least two years' trial. For instance, a highly promising beebalm, monarda 'Granite Pink,' last year behaved as a heaven-sent dwarf, twenty-inch clump. This year, however, in spite of dryness it should by no means relish, it persisted in growing thirty- to thirty-six inches, as a typically buxom cultivar would. Has it accidentally been mixed with its robust parent 'Croftway Pink' somewhere along the line, or were earlier specimens never observed into full maturity?

Certainly, a spectacular prospect for the near future looms in *Sedum maximum* var. *atropurpureum*, which could well (and mercifully) be dubbed "the mahogany plant!" Its height is about twenty-six to thirty inches, its form airily erect and wedge-like. From May on, the obovate, three-inch leaves are tinted a stunning bronzy purple overcast mahogany. In late summer, loose cymes of soft creamy rose top the rich foliage in telling contrast. The total effect is coolly delightful, and the plant grows contentedly in reasonably good, sunny soils. Here is a superb new perennial for arrangements, or for the border, as a pleasing relief to yellow or white blossoms. It is also a magnificent specimen near walls or other structural features. Clumps will probably be available in 1958, decidedly so in 1959.



Dianthus 'Pink Princess' was bred at the U.S.D.A. Field Station in Cheyenne, Wyoming. Its fragrant, semi-double flowers are borne profusely May-July.

Many gardeners know those forms of *Achillea filipendulina* widely distributed as 'Gold Plate' or 'Parker Variety.' However, some consider their brawny four-foot stature too domineering, their great, platter-like flower-heads of glittering yellow too bold and garish. These objections do not hold water for the recent English hybrid 'Coronation Gold.' Essentially, this achillea becomes a restrained, less aggressive version of existing cultivars. It grows only to a neat two and a half feet and bears tidy two and a half-inch blossom heads of clear yellow from late May into August, at least. Splendid for cutting or drying, 'x Coronation Gold' can grace the most civilized border, as well. Again, it can be procured on a limited basis now but should be very plentiful by 1959.

The U.S.D.A., at its Field Station in Cheyenne, Wyoming, has been assiduously breeding *Dianthus* species and cultivars by the acre. The resulting seedlings are then exposed to the area's murderous winters, and all but the sturdiest succumb. 'Pink Princess' is a handsome survivor, a grand new pink of fragrant, beautifully fringed, semi-double flowers of a warm rose-coral pink. The gray clumps are steadfastly hardy and are fifteen to eighteen inches high during their lavish May-July display. 'Pink Princess' should be in heavy demand for years to come.

The writer and others have been "feeling their way" on intercrossing species of America's own *Phlox* family. First impressions leave the positive belief that *P. paniculata, P. pilosa, P. glaberrima, P. divaricata, P. subulata, P. ovata, P. pulchra,* and some forms of *P. carolina* can be interbred. However, seed is scanty, and many crosses should be made. Unfortunately, most bloom when the commercial nurseryman is busiest and thus restricted from large-scale experimentation. If time and space could ever be made available, interesting, worthwhile new material would be assured.

There is, at long last, a truly red *Phlox subulata*; the name is 'Scarlet Flame' and it far outshines such magenta excuses as 'Brilliant' and 'Crimson Beauty.' The color is roughly scarlet overlaid ruby, and it should highlight many spring rock garden scenes.

Summer phloxes of *P. paniculata* identity will boast a few desirable additions to their fold. 'Fanal,' a pure red of no orange or crimson nuances, is especially striking near dusk, when it can only be called a gorgeous blood-red. 'Dresden China,' of very large florets, bids fair to make 'Elizabeth Arden' look to its laurels as the best pastel pink. Not everyone is attracted by purple shades, but 'Marlborough' has an effectively glossy sheen. 'Holyrood,' a bushy twenty-inch thicket of exceptionally sizable florets, is so magnetic a flame-tangerine, introduction may be delayed until 1959 to replenish stocks.

Graceful and fetching are the long-spurred aquilegias of the Mrs. Scott Elliott strain, but they must now yield top billing to the McKana Giants. The latter, carefully bred over many years in the trying weather of Chicago, are outstanding for vigor and color range.

Moreover, their huge flowers may swell open to four inches or so, with gaily tinted spurs of equal proportions.

Nearly any plant lover becomes excusably excited at the prospect of a hitherto unsung native flower being steadily glamorized. Consider *Penstemon,* whose two hundred and fifty species largely inhabit this continent, but in relative obscurity to date. It now appears as though great stirrings of interest, primarily in the West, will bring forth fine additions to American gardens. The Fate Hybrids and Seeba Hybrids, now in commerce, are of *P. grandiflorus* x *P. Murrayanus* ancestry. The superb four-foot plants far surpass either parent. Large bells of white, pink, red, or purple dot the willowy stems in early summer; some of the pinks are entrancingly soft ivory, coral, or flesh in tone. Rounded, glossy leaves have been compared to those of a *Eucalyptus* for their vertical tilt. Light, well-drained soil in sun is wanted, as are eighteen to twenty-four inches of elbow room.

The future looms brighter for the penstemon, mainly due to astute amateurs in our far-flung hamlets. Presumably the elegant Fate Hybrids are being crossed to the stockier Flathead Lake strain, to produce tightly packed spikes of large bells.

Lilies are riding high in public esteem, but so much has been accomplished it is folly to single out any special offering for mention here. Suffice it to say, gardeners should use them freely, but must be certain their soils are porous, never waterlogged. Also, the new trumpet forms in soft pink or yellow appreciate a touch of shade in warm areas to preserve their complexions.

Hemerocallis, the ubiquitous day-lily, also dwells "in fashion's brightest blaze," and justly so, in view of the permanence and beauty. Hundreds of wonderful cultivars are in existence, but 'Shangri-La' has been a revelation in this dry year. This limber, three and a half-foot treasure shines in July-August with tastefully recurved blossoms of velvety scarlet. Each petal is centered by a narrow streak of gold.

Loose cymes of creamy rose top the bronzy purple foliage of *Sedum maximum* var. *atropurpureum.*

No one should shun contemporary lythrums as the dingy, swamp-dwelling purple loosestrife of yore. No longer are they "dreadfully staring thro' muddy impurity," and how they can laugh off drought! 'Morden Pink' is clear rose, with three to three and a half-foot wands nearly all summer, and 'Morden Gleam' approaches red, in its deep carmine glow. The latter is also a surprisingly rewarding cut flower. Both thrive blissfully in sun or shade, never suckering or self-sowing badly.

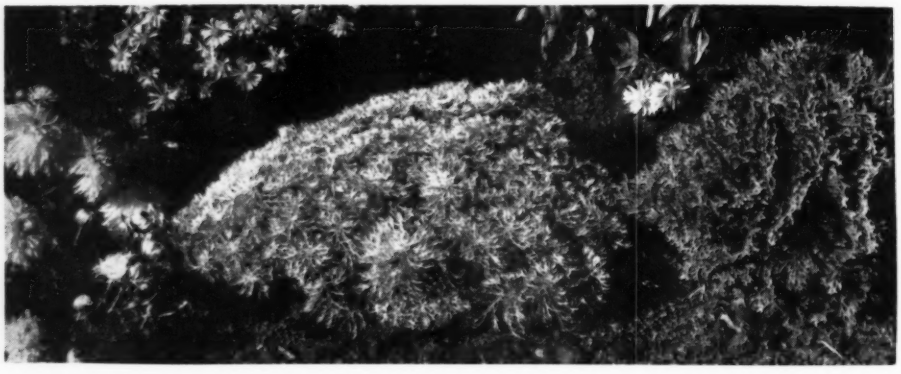
Fall's hardy asters are almost totally derived from American natives; sad to relate, nearly all improvements stem from European breeders. It is therefore doubly welcome to note the progress already credited to Leroy Breithaupt, of Corvallis, Oregon. Most of his current introductions are dwarfs, but vigorous, clear of color, and relatively free from disease. He has crossed standard cultivars to a form of *A. Douglasii,* and this fall will see a brand new group making its eastern debut. 'White Fairy' and 'Pink Bouquet' are definitely choice ten to fifteen-inch dwarfs, but are only the beginning, we feel certain.

Many selections of the taller *A. novi-belgii* are worthy of garden space for their September-October outbursts. A number are addicted to faulty carriage, however, and require staking to withstand autumn buffetings. Especially commended for erect habit and appealing flowers are 'Clarity,' white, three and a half feet; 'Eventide,' a majestic deep blue-purple; and 'Radar,' only two and a half feet tall, perhaps the most vivid red. New for 1958 is 'Marie Ballard;' this fine, large-blossomed import has nearly doubled blooms of soothing powder-blue.

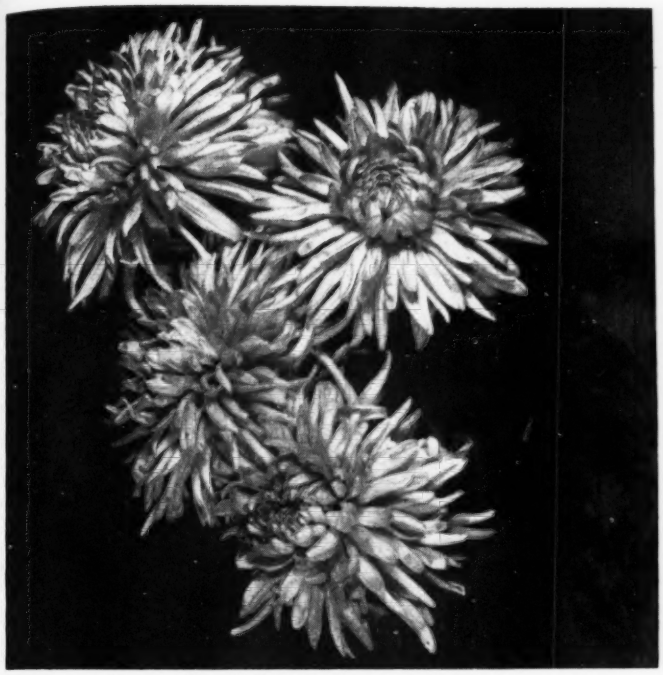
Gypsophila 'Bristol Fairy' has long ruled the roost as the favorite baby's breath, but the upstart 'Perfecta' will prove a worthy foe. Individually, the white flowers are at least twice as large and surely do billow into an impressive panicle. First impressions lead one to write off 'Perfecta' as coarse and scanty of blossoms, but more searching tests disprove that notion. Here is another delectable filler for bouquets, or a conciliatory gauze-like subject to tie in more positive border groupings.

One sees the rotund little artemisia 'Silver Mound' in ever-increasing amounts, yet it never seems to pall on the eye. Only twelve to fifteen inches high, scarcely any broader, it presents filagreed, dainty leafage coated as if by liquid silver all summer. A "must" for rock garden or wall, it also becomes a pleasing foil in perennial borders or foundation plantings. Sunny, dry soils, with division each third spring, are its only needs.

Not new, but rare, is the European ginger, *Asarum europaeum*, which insists on rich, moist settings, in some shade, to flourish. There it becomes a



Artemisia 'Silver Mound' is enchanting in rock garden or wall.



Chrysanthemum 'King's Ransom' is an outstanding new cultivar, capped in gold.

Chrysanthemum 'Lady Fair' is a 1958 debutante with orchid-pink to lavender flowers.

glossy, rounded, little twelve-inch hillock able to endure for years. The large, kidney-shaped leaves are of leathery texture and deeply green, so the whole effect is one of opulence. One can forget the eccentric, half-obscured, chocolate-maroon flowers of early spring, for the foliage alone gratifies. As an edging or occasional specimen dotted in shady nooks, it has no peer.

Also beloved for shady haunts are the hostas. *H. plantaginea,* the August plantain-lily, has long been favored for its huge white trumpets of enticing perfume in late summer. Yet, it is prone to rot in wet winters, and the ample leaves freeze easily in early cold snaps. 'Honeybells,' bred from the above and *H. lancifolia,* does not have these failings, being thoroughly self-sufficient. Average-sized lily blossoms, deliciously fragrant, are pale lavender pencilled blue on two and a half-foot stems, mainly in August. Such a plant can thrive indefinitely in a cool, well-fed corner or on north sides.

The taller veronicas offer spire-shaped blossom spikes in summer, and the finer ones are perfectly hardy. *V. spicata* 'Minuet' yields pretty rose-pink tapers from late June-August on a grey-clad, fifteen-inch frame. 'x Sunny Border Blue' is a telling deep blue ornament most of the summer, and has glossy leaves, as well; it may attain two feet. 'x Icicle,' a little taller, is an unbeatable white seemingly never without flowers, or out of sorts. 'x Pink Spire' is new, grows to two and a half feet, and is best in midsummer. *V. longifolia* var. *subsessilis* 'White' is also fine in August, as is the whimsical deep blue *V. holophylla*, but fifteen to eighteen inches tall and darkly handsome of leaf.

Shelley may have vowed daisies to be "those pearl'd Arcturi of the earth," but it is to be feared that some gardeners do not share his enthusiasm. However, anyone scorning the Shasta daisy 'Mark Riegel' is missing a good bet for summer cutting or border showing. This stocky two to two and a half foot subject seems hardy as an oak and carries many fine three to three and a half inch semi-double flowers of gleaming ivory over a long period. It is more than tolerable in partial shade, too.

Most well-appointed gardens depend on chrysanthemums for the year's finale, and no better choice is possible. In the welter of outstanding cultivars, only a few can be mentioned herein. 'Lady Fair,' a 1958 debutante, will delight lovers of gentle shades by its nicely recurved, three and a half inch flowers of orchid-pink to lavender. 'King's Ransom' is unbelievably erect, like a pillar capped in gold. 'Sundance' (not the pompon similarly named) is a tremendously vigorous, amazingly hardy bush three feet tall, with warm yellow blossoms over three inches across. A number of promising whites of recent vintage also offer tempting possibilities.

While no details can be published until early 1958, the public can be informed that the first All-American mum winners will be disseminated in the spring of the coming year. The same vigorous testing and judging schedules inflicted on roses, annuals, gladiolus, vegetables, are in vogue here, too. Gardeners will do well to try the initial offerings, for some rather hard-boiled judges have already nodded approval in many different locales.

SOURCES

for above-mentioned perennials:

Shasta Daisy 'Mark Riegel'—Wayside Gardens Co., Mentor, Ohio

Aquilegia McKana Giants—many seedsmen and nurseries

Penstemon Fate Hybrids—Inter-State Nurseries, Hamburg, Iowa

Gypsophila 'Perfecta'—Jackson & Perkins, Newark, N. Y.

Hosta Plantaginea — Jackson & Perkins, Newark, N. Y.

Veronica Subsessilis 'White' — Jackson & Perkins, Newark, N. Y.

All others—Bristol Nurseries, Bristol, Conn.

Outdoor Chrysanthemum Culture

By **Spencer Harrison Capreal**

continued from September-October

PLANTS REQUIRE larger amounts of the major nutrient elements than they do of the trace elements. To keep a continuous supply of all these nutrients in an available and balanced form for optimum plant growth is not as simple in practice as one may be led to believe.

The major nutrient elements come from numerous sources, from the complex forms (organic) which take time, under favorable conditions, before they are available to plants to the simple forms (manufactured chemicals) that are soluble and readily available to plants.

The Association of Official Agricultural Chemists is continuously evaluating the strength (percentage) of material containing nutrient elements that are of interest to the fertilizer manufacturing industry and the user. These values represent what may be expected when added to the soil under favorable conditions.

Nitrogen, phosphorus, and potassium are applied to the soil oftener than any other nutrients. They are commonly referred to as the primary fertilizer elements. In commerce, these fertilizer elements come in many formations and strengths, either singly or mixed. There are, by far, many more "brand" name fertilizers (generally with NPK values mixed) than there are sources of nutrient elements. A knowledge of their availability to the plants and their strength is important in knowing when and how much to add to the soil.

In the fertilizer trade the term *available* is generally used in its broader sense. That is, any nutrient element that has its nutrient content designated (percentage of strength) can gradually or quickly be made available for plant consumption under favorable conditions. To the plant, *available* means in an ion (cation-anion) form—a molecule broken down into atoms which are free in the soil solution or adsorbed to the colloidal matter in the soil, whereby the plant's root system can absorb it. Favorable conditions are factors that control (retard or hasten) availability. Thus: (1) Temperatures below 50° and plus 95° will gradually retard or stop the activities of soil organisms in their function of breaking down more complex molecules. Under these temperature conditions, especially below 50°, but not freezing, the use of rapid (soluble) forms of fertilizers would be advisable. (2) Very high or low soil pH has a retarding effect on the activities of soil bacteria. It also combines some of the nutrient elements into forms that are not available to the plants. (3) Air and moisture are essential to availability. A lack of oxygen and/or moisture will prevent free absorption by the root system. Similarly, a lack of moisture will cause wilting and shock to the plant.

Chrysanthemums may be considered heavy feeders. With the exception of roses and other deep-rooting plants, chrysanthemums utilize effectively more nitrogen than most.

Of the three primary fertilizers, nitrogen may be considered the most critical. Because of its susceptibility to leaching, heavy rains or heavy watering can wash it out of the soil at the time when it is in its most available form. Potassium is the second critical element because some leaching can take place. Phosphorus generally stays put in the soil, and it is advisable to have it in the soil to the depth required.

We shall divide the sources that contain these primary fertilizers (NPK) into three classes: slow (organic), fast, and rapid (chemical).

Slowly available plant nutrients are generally in an organic form and in the mineral soils. Organic substances (from living things used for soil improvement) are composed of complex molecules that require breaking down, freeing the atoms from the ring or chain formation to which they are attached, before availability can be accomplished. This process requires a number of special soil micro-organisms (bacteria, actinomycetes, and fungi), air, water and several weak acids (carbonic, nitric and sulphuric). These are produced in the soil and act as solvents, changing unavailable into an available form, when favorable conditions exist. Organic matter, as used in soil improvement, does not contain large amounts of fertilizer elements.

The peats, which are decomposed organic matter, formed under anerobiotic conditions, may contain (depending on source of supply) from 1 to 3 percent of nitrogen; phosphorus averaging less than 0.25 percent; potassium even less than phosphorus. Calcium content is quite high in some, may reach as high as 6 percent. The average magnesium content is about twice that of phosphorus and potassium, while sulphur content is considerably more, approximately 1 to 2 percent. Thus, the major nutrient elements are all represented in peat, but the indications call for additional applications of P, K, Ca. and Mg. Peats do contain large amounts of calcium, but analysis generally shows low pH, and it is advisable to make liberal applications of Ca. for a more favorable pH. Peats do contain some or all of the trace nutrient elements in much smaller amounts, depending on the source of supply. It is advisable to check on any deficiency in trace element content, unless it is known that the chemical fertilizers used contain these elements.

Animal manures are partly decomposed substances before being voided. Manures start decomposing quite rapidly in the presence of moisture, air (oxygen) and favorable temperatures. The fertilizer content of farm manures is very low in comparison to chemical fertilizers. There are, of course, variations in these manure contents due to food eaten, age of animal, bedding used, and storage conditions. Of the many analyses made of farm manures, a reasonably good average may be considered as containing 0.6% N., 0.4% P., 0.6% K.

The dried manures bought in commerce generally contain two and three times as much NPK as farm manures. Better care is taken in preserving both the liquid and solid manures from leaching and volatilization in the drying process.

It is obvious that the nutrient supply to meet plant requirements is quite low

in manures and more so, when we consider that probably not more than one-half of the nutrients will be available in the first growing season, under favorable conditions. The problem of leaching (especially of nitrogen) will reduce the available nutrient supply still more under unfavorable conditions (too much rain or watering).

Experiments have proven that manures with chemical fertilizers have produced more and better results than manures without the addition of chemical fertilizers.

It may be of interest to note the part that organic substances play in present-day soil management. In bygone days, animal manures were considered the principal source of plant food — by many the only source of supply. Today, organic matter is valued for its humus content (physical structure), its ability to breathe air and hold moisture, and its durability rather than its nutrient value. Somewhat reluctantly, but gradually, the benefits of chemical fertilizers were observed and their use increased to a point where, as we shall see, it is the most important factor in soil fertility programs.

The disadvantages in the use of animal manures have caused a number of research stations to withhold recommendations for their use in volume in greenhouse and garden. Manures have a high microbial population and a high carbon ratio which intensifies bacterial activity. The large amounts of oxygen consumed in the process reduces the oxygen supply to the plant's root system. Manures in the process of decomposition disintegrate faster than peats and replenishments are required more often. Not too long ago, experiments were conducted at the U.S.D.A. Station in Beltsville, Maryland, with some bulbs in varying mixtures of soil and manure. The results appeared to indicate a relationship in the incidence of fusarium disease — the greater the amount of manure in the mixture, the greater the incidence of fusarium. I do not know how this condition may affect chrysanthemums but it is thought-provoking. I have been quite fortunate not to have been troubled with fusarium, but I have not used animal manures for fifteen or more years.

Decomposed vegetation is also a source of plant nutrients in an organic form. Groundcovers (green manures) are probably the oldest—occurring in historical references—for soil improvement and fertility. The nutrient value of groundcovers depends on the kind of crops planted and the conditions under which they have been grown. Quite a number of crops, both legume and non-legume, are grown as groundcover, and most of them, planted to be turned under, can be grown in cooler climates, where planting dates for chrysanthemums are July 1. In warmer climates, it should not be a problem. Ask your local farm bureau for suitable varieties and planting dates. Non-legume crops, when turned under, return most of the nutrients they have taken up from the soil. Legume crops contain larger amounts of nitrogen, by synthesizing nitrogen from the air, forming nodules on the roots, in addition to what they take up from the soil. The nitrogen contents of these nodules depend on the variety and growing conditions.

Before the value of peat moss was fully understood, greenhouse operators used considerable amounts of composted sod for bench soil.

Leafmold and composts have some similarity in their organic nutrient contents; when leafmold is incorporated with the soil, it is a question of how much of its nutritive value will be retained because of leaching out. The addition of fertilizers (NPK) and lime will not only hasten decomposition but also enrich the fertilizer contents.

Varying in areas, even locally, mineral (sand, silt and clay—disintegrated masses of heterogenous rock formations) soils do contain many of the nutrient elements a plant requires. Unlike manufactured nutrient elements, those in mineral soils are very slow in availability to plants. Air, moisture, bacterial activity, and soil acids break down the nutrient elements in mineral soils into an ion form, thus making them available to plants. In general, it may be assumed that mineral soils will supply most, if not all of the plant requirements for trace elements. The major nutrient supplies are quite low, with the exception of sulphur. Additional applications of NPK-Ca. and Mg. should be made.

Progressively, as the complexities of the soil and the availability of plant nutrients became better understood, changes also took place in fertilizers and fertilizer practices.

For convenience, or should I say arbitrarily, I have classified plant nutrients as "slow," "fast," and "rapid." To this I have made additional classification as organic, mineral, and manufactured chemicals. The purpose of classifying plant nutrients in such a manner is primarily to give an approximate period of time when plant nutrients may be available under favorable conditions. Chemically, these three classifications do overlap as organic and inorganic substances. Technically, organic substances are derived from living things and contain carbon as an essential compound, and organic chemistry, being the chemistry of carbon compounds, defines all other substances as inorganic.

Several manufactured chemicals available to the gardener are classified as synthetic non-proteid organic nitrogen (containing carbon) by the Association of Official Agricultural Chemists, such as urea (42-46% N), cyanamid (21% N), and urea-form fertilizers (38% N) that are sold under a number of brand names. Here we have one example whereby manufactured organic compounds can be classified as slow, fast, or rapid in availability. Thus: (1) Urea-form, a more recent introduction and still under test, is a combination of urea and formaldehyde, containing 38% N. These formulations are made so as to

release *slowly* nitrogen over a period of two months or more. (2) Cyanamid, containing 21% N, can be classified as *fast*. Direct applications may take a week or more before the effects are noticed. It is also used as a defoliant. (Not recommended for chrysanthemums.) (3) Urea contains 42 to 46% N. It is thoroughly soluble and *rapidly* available to plants.

It should be apparent by now that a simple classification of organic or inorganic will hardly answer the gardener's question of how much and how steadily will the food supply be available to his plants. This question of availability and supply can be more closely determined with manufactured fertilizer chemicals. In greenhouse fertility management, there are instruments that will measure the nutrient levels for NPK and Ca. and indicate if the recommended nutrient levels have been reached. Outdoors, these instruments are not too practical.

In considering chemical fertilizers as quickly available, some distinction should be made between fast and rapidly-acting forms. Let me make a broad, rather than a specific distinction. Fast-acting fertilizers are those applied directly to the soil in a dry form—powdered, pelleted, or granulated. The speed of availability depends on how soon the soil solution can dissolve the fertilizer and have it reach the plant's root system. Dry fertilizers are applied on moist soils and watered in afterwards in order to hasten this solubility action, as well as to force down the plant food to the root system. Rapidly-acting fertilizers are those which are thoroughly soluble and applied to the soil in a liquid form or in a watering system.

Probably the question most frequently asked about fertilizers is: "Which is the best?" Technically, there should be no difference. All plant nutrients must be reduced to an available (ion) form before plants can absorb them. However, this does not mean that some of these fertilizer compounds cannot be used to a better advantage under some certain conditions. Two of these conditions, temperature (cold or hot) and soil pH, have to a great degree similar reaction in retarding microbial activities, thus reducing nutrient availability. High or low soil pH also produces a chemical reaction, especially on phosphates, which also reduces availability. In both of these conditions, a soluble fertilizer can help to keep the plant supplied with food.

The question of fertilizer values should really be two related questions—dollar values and quantities to be applied. If you have a choice of purchasing a bag of fertilizer containing 20 units, 40 units, or 60 units (units are the percentages of available fertilizer) for $3.50, $6.00 and $8.50, it would be simple to measure the dollar value by the quantities you expect to apply to the soil. Let us say that you have followed a practice of applying three pounds of 20 unit fertilizer with good results and wonder what the 40 and 60 units will do for you. On a percentage basis, one and a half pounds of the 40 units or one pound of the 60 unit will give the same results as three pounds of the 20 unit fertilizer; in another way, one bag of 60 units is equal to three bags of 20 units, and one bag of 40 units is equal to two bags of 20 units. These units refer to mixed fertilizers with formulas of 5-10-5, 10-20-10, and 15-30-15, and the prices are examples only. It should be obvious that storage, handling, and transportation charges would be less for one or two bags than it would be for three bags. There is also another advantage in high unit value fertilizers — they generally contain greater amounts of thoroughly soluble chemicals and are, therefore, more quickly available to plants.

In the earlier days, soil fertility was maintained by organic materials and as a reinforcing supplement to the manures used, other organic substances (vegetable, tankage, slaughter house waste) were used which contained higher percentages of N, P or K. Organic materials are slow, safe, and expensive. The availability of nutrients in an organic form is affected by temperature and soil pH. The most favorable conditions for organic nutrient availability are: temperatures 60° to 80° F., soil pH 6.0 to 7.0. Conditions above and below these figures gradually reduce availability.

Chemical fertilizers had a bad start. Being powerful, overdoses were harmful and discouraging, but time and experience taught a better understanding of their strength and quicker availability. Chemical fertilizers in the trade are evaluated on the percentage of availability under favorable soil conditions. 1) Nitrogen, represented as N in the formula (mixed or as a single element), may be dissolved in water or used directly (in dry form) for soil application. In general, fertilizer nitrogen in the soil quickly releases ammonia (partly available to plants), quickly changes into the nitrite form (not available to plants), and then to the nitrate form (fully available to plants). Nitrogen in the ammonia form does not leach readily from the soil, but in the nitrate form leaching is a problem. Nitrogen in an ammonia form has an acid reaction in the soil; in the nitrate form, such as nitrate of soda, the reaction is basic (alkali). The continuous use of nitrate of soda could build up the metal sodium in the soil, which can be harmful to vegetation. You can purchase brands of mixed fertilizers that have been made basic or neutral by the addition of lime in some form. 2) Phosphates, represented as P_2O_5 (phosphorus pentoxide) are obtainable as water-soluble and citrate-soluble form. Phosphates hardly affect soil pH unless ammonia is present and only to the extent it contains ammonia. Phosphates can change to an unavailable form under unfavorable soil conditions and revert under favorable conditions. Leaching is no great problem. 3) Potassium, represented as K_2O (potassium oxide), is soluble in water and available. Potassium is also of some concern in leaching. Potassium in this form has hardly any effect on soil pH; but under some conditions, if too much is used, it can change or become harmful to plants.

Watering affects nutrient availability and conservation. Too much water will lower plant nutrients below the root system, too little water will concentrate plant nutrients and may cause harm. As chrysanthemums are shallow rooting plants, watering to a depth of six or seven inches should be sufficient. A quart or so of water per plant, twice a week during a dry spell is good practice. After heavy rains, it may be advisable to apply small amounts of nitrogen as a side dressing or in a liquid form.

The objective of any fertilizer is to have an available nutrient level in the soil sufficient for the plant's requirements. Empirical research has provided several systems and instruments whereby a reading of NPK and Ca. can be seen

(Continued on page 192)

Upper left. Winter feast for birds.

Upper right. Robins and evening grosbeck feed on Asiatic crabapple in February.

Lower right. Ornamental planting of Asiatic crabapple.

ASIATIC CRABAPPLES --

DUAL PURPOSE ORNAMENTALS

By R. D. Anthony

THE LIST OF desirable ornamental trees able to withstand temperatures of ten to twenty degrees below zero is not long. For this reason, the recognition of the unusual desirability of the Asiatic crabapples for both home and park plantings has been of much importance in the Allegheny Plateau area of Pennsylvania and New York where elevations are around two thousand feet and temperatures of thirty degrees below zero are not uncommon. In addition to their beauty throughout the year, another quality is creating wide interest in these crabs in this area. Many of these crabapples hold their fruits on the tree well into winter and so make a most desirable addition to the winter food for our wild life. Around the home their fruits bring in many winter birds. In the parks and around the hunting camps the frozen fruits are eagerly eaten by deer, pheasants, grouse, rabbits. In fact, the whole list of winter wild life will use them.

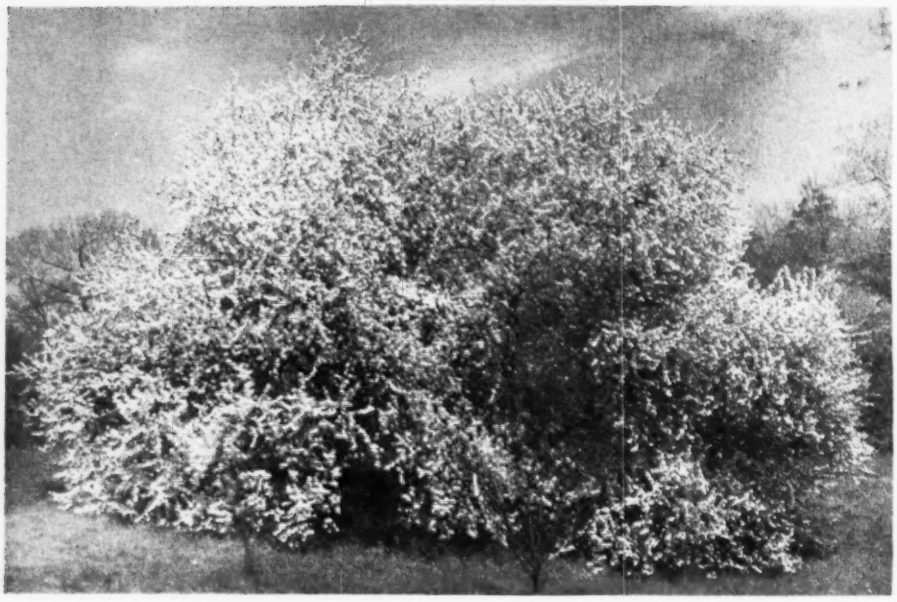
Except to the fruit grower, these crabapples were almost unknown until nearly the end of the last century. In the apple orchards of the colder areas of the East and in the northern Mississippi Valley, the larger "Siberian" crabapples and their hybrids with cultivated apples were commonly grown during the last century, but their ornamental value was not recognized.

Just at the end of the century, Professor C. S. Sargent, then Director of the Arnold Arboretum, became interested in these crabapples while visiting in Japan, and he sent back to the Arboretum propagating material from a number of kinds. Other plant explorers from the Arboretum secured specimens from Manchuria and North China. Plants coming from such a wide geographic distribution and from regions with climatic and soil differences showed many differences in size and form of trees, size and color of fruits, leaf form, vigor and hardiness. Several hundreds of these different types have been grown in America.

Many of these types have been described as distinct species; others are classed simply as varieties. The progenitor of all these types came out of northeast Asia, and probably had many of the characters of what is now called *Malus baccata.* Unfortunately for the botanist's peace of mind, these various forms cross pollinate readily and many such cross-bred seedlings have been distributed under the name of the seed maternal parent. This has resulted in much confusion as to names and descriptions.

Fortunately, many of the original importations are still growing in the Arnold Arboretum. Also in a number of other arboretums there are trees grafted from the originals so that it is still possible to reproduce the type tree of many of the presently named species. In at least four species of these Asiatic crabs, the seed is not a true seed but is a bud of the maternal tree enclosed in seed coats as in regular seeds. Seedlings grown from these seeds come true to the maternal tree. (Such seeds are called apomictic seeds.)

For a number of years Dr. Donald Wyman has been in charge of the crabapple collection at the Arnold Arboretum. Dr. Wyman in 1943 and again in 1955 prepared very complete reports on "Crabapples in America" (published by the American Association of Botanic



Above. *Malus baccata mandschurica*
Left. Flowers of *Malus atrosanguinea.*
Bottom. *Malus hupehensis.*

Gardens and Arboretums). In these reports are given short descriptions of each species or variety, its value for ornamental flowers or fruits, its economic value, and the period of blossoming and fruit maturity. Some species or varieties develop into trees nearly as large as cultivated apple trees. Others at maturity are not more than ten feet tall. Some trees are upright, others spreading. Some trees have pure white flowers; others have flower buds that are clear red on the outside but open to a light pink. Some have yellow fruits; others have fruits blushed with red or entirely overspread with coral-red. Singly or in mass, these crabapples are strikingly beautiful in flower, in fruit, and in tree form.

Because specific names of Asiatic crabapples have been used so loosely and so many hybrid seeds have been distributed as pure species, specific names of these crabs do not have too great reliability. With many arboretums beginning to place more importance on securing reliable collections of Asiatic crabapples, it is to be hoped that this uncertainty will be cleared.

The value of these trees for winter wild life food makes fruit persistence a factor of considerable importance. Even within a single named species not every individual specimen holds the fruit on the tree into winter. A few of the species which seem most desirable for both ornamental and wild life food are *floribunda, prunifolia, purpurea, Eleyi, Sargentii, Sieboldii, torengoides,* and *Zumi.*

Asiatic crabapples are unusually free from damage by insects and diseases. The extensive consumption of the fruits by wild life and especially the very heavy visitation by birds is probably responsible for the low insect attack. These crabs are so resistant to apple scab and fire blight that recently pathologists have undertaken to breed their blood into our cultivated apples as a means of protection from these destructive diseases. The writer has grown a considerable group of these crabs for more than twenty-five years without any spraying.

One of the chief problems in planting Asiatic crabapples is damage wrought by mice, rabbits, and deer. Wire cloth guards of quarter-inch mesh are effective against mice and rabbits, but deer will browse the terminal growth as high as six feet. In residential areas this will not be a problem, but around hunting camps it may be necessary to build pole fences around each tree for a few years. This, of course, will limit the number of trees to be planted, but the future wild life food value is great enough to justify the time.

If the present rate of planting these hardy Asiatics continues, several cities of the Allegheny Plateau will become show places and rival more southerly towns with their dogwood and Japanese cherry displays.

"Thorndon Hall" as it was during the childhood of the eighth Baron Petre before he made any alterations. Taken from Magolotti, Lorenzo (1637-1712): Travels of Cosimo, the Third Grand Duke of Tuscany, through England during the Reign of King Charles the Second (1669), translated from the Italian manuscript in the Laurentian Library at Florence. London 1821.

JOHN BARTRAM AND THORNDON PARK

By **Winifred Notman Prince**

Continued from September-October

Through these early years Lord Petre had been assisted by his secretary, John Tempest, but this assistance came to an end in February, 1737, with Mr. Tempest's death. His burial slab, in the little church of St. Nicholas which Lord Petre had built, has an inscription which calls him the dear friend of Lord Petre.

Collinson visited "Thorndon" in August, 1737, and again inspected the seed beds. He found that the oaks, junipers, cherries, and tulip-trees had germinated well. The sweet bay also had come up in great quantities. Sassafras and white pine were still unsuccessful, and mountain-laurel had not appeared.

In September, Lord Petre visited his cousin the Duke of Norfolk at "Worksop Manor," an estate of some seventeen-hundred acres in Nottinghamshire, which the Duke had started to reforest. They tramped through the furze and bracken to the hill tops, clambered down into the dales, surveyed the level low land, and discussed plans. He returned to "Thorndon" with rough sketches of the terrain. Lord Petre prepared detailed plans of the design for the park with directions for the planting of trees. Just as he had planned at "Thorndon" to make use of the difference in level, even emphasizing them by the creation of mounds, he recorded in his sketches the contours of the five hills separated by steep-sided dales that surrounded the mansion, and suggested the trees that he visualized as clothing their barren slopes. English oaks and beech, of course, Spanish chestnuts to give color when in blossom, North American hemlocks and larches, and European pines and yews for winter green were to be planted in clumps and faced with box and privet.

Back at "Thorndon" with the fall planting cut short by the short dark days of November and December, Lord Petre worked out the finished drawings and specifications for the contract to carry them out. On the highest hill there would be a temple with an avenue of evergreens leading the eye to the focus, in the Italian manner of Palladio which he had learned from Giacomo Leone. The stream would be crossed by a low arched bridge which had been made fashionable by the Earl of Pembroke. The driveways from the entrance to the mansion and to the stables were planned geometrically to conform with the formality of the pleasure gardens, and kitchen gardens, and the design was outlined by the use of box and yew hedges backed by clumps of trees, both evergreen and deciduous.

Although Lord Petre did not have an exact topographical survey, he gave detailed directions for grading, even to the use of concave levels. The trees

that were to be combined in clumps were named, and the distances apart of the trees from one another, and of the clumps, were stated. For example, on a given hill the instructions were:

"Yews with pinasters in clumps
Theas clumps must consist of 5 or 6 trees
Each to be plas'd att from 30 to 80 feet apart
Yews with larch in small clumps. These clumps must be ye same as the last and be plas'd att from 50 to 90 feet apart.
Pinaster with some silver fir (i.e. abies alba from Neuremberg) towards ye front line.
Theas silver fir are to be in small clumps of 6 or 8 trees in a clump and must be plas'd att from 40 to 80 feet apart only on and towards the front line."

Lord Petre's nurseries were coming along satisfactorily, and he ventured to recommend the use of mountain-laurel from North America, along with European and Asiatic flowering shrubs. The introduction of laurel had not been easy. Collinson and Bartram had worked over the problem for several years. Collinson thought it impossible to germinate the seeds, which he had found "too chaffy," and had asked Bartram to transplant small specimens from the wild into boxes in his garden on the west bank of the Schuylkill River below Philadelphia, and to keep them for a year or two before placing them on a ship.

Collinson gave explicit directions for their reception in England also. A nursery bed was to be prepared where the boxes of newly-arrived plants could be placed. The sides of the boxes should be "knocked off all round and then the plants and sods of earth, with the flowers in them will be easily discovered and removed with safety. Great care should be taken to keep the mould about the roots. When all the plants are set, spread the remaining mould on the bed; for variety of plants and flowers often spring from it. Give gentle watering to settle the earth about the roots. Then turn twigs, or hoops, across the bed and cover them at first close with mats night and day, only give them the warm rains, but keep them from frost and sharp winds, for by being on ship board and kept in boxes the plants are made tender and rashly exposing them . . . . . Whereas by hardening them by degrees they will endure our season."

In the spring, Collinson brought to the ponds at "Thorndon" some North American inhabitants. In the previous fall Bartram had sent some turtles and some turtle eggs. By chance the eggs hatched out just as the ship reached port, but unfortunately the young did not survive. The adults, however, lived to give pleasure to the household at "Thorndon," which included little Catherine, aged two years. Collinson talked over with Lord Petre the possibility of Bartram's collecting along the Atlantic Coast of Maryland, as far as Cape Charles, returning to Philadelphia by the Chesapeake shore. Lord Petre sent Bartram berries of butcher's broom and juniper which he had gathered in the woods of "Thorndon."

In April Lord Petre wrote to ask Dr. Richardson what stove plants he would like, suggesting cacti and Barbados alaes. Dr. Richardson replied that he would like a Hottentot fig from Africa for his stove, and some magnolias for the beech grove in the valley of his stream. However, Lord Petre had only a few of these and could not spare them.

Important changes had taken place in "Thorndon Hall" itself. The east wing was finished during the summer; and none too soon, for there were now two little girls in the household and soon there would be a third. The new chapel was finished and ready to be consecrated.

The Right Reverend Lord Bishop Benjamin Petre, Vicar Apostolic of London, was asked to bless the chapel. He lived at Fithlers, near Writtle, for he was a son of John Petre of the younger branch of the family. He had been tutor to Lady Petre's father and the young James Stuart, when they were being brought up together at St. Germain-en-Laye. One of the four assisting priests was William Shimmell, who had served as steward of the Petre estates from the time of the seventh Baron. On a cold November 17, the ceremony was performed.

The stoves were now producing guavas, ginger, limes, papaws, bananas, and pineapples in abundance, and Lord Petre regaled his friends with them. Just after New Year's 1739, he sent Sir Hans Sloane two bananas as a gift, with some misgivings as to whether they might not be over-ripe. When Collinson stayed at Thorndon he was served so many pineapples that he was "cloyed" by them.

The triumph of Lord Petre's stoves came in August, 1740, when a camellia from China flowered for the first time in England. It had double crimson blossoms, which Collinson, in writing to Sir Hans Sloane, said were as large as hollyhock blossoms.

In June the garden had produced another rarity, a passion flower from tropical America, introduced by the seed merchant, John Warner. Collin-

Excavation of old "Thorndon," September 1957 under the auspices Essex Record Office.

son thought that being planted in a border of earth and having a great deal of room to ramble was probably the cause of the flowering. Collinson himself had had the good fortune to have a cypripedium bloom in his Peckham garden a month earlier, and "Thorndon" saw the first blooming of day-lilies and *Phlox divaricata* from Pennsylvania.

Meanwhile the stock of flowering shrubs in the nurseries was increasing rapidly. They were raised from seed and by layering, budding, and grafting. In September the garden was purple with the fall asters from North America, forerunners of the fine Michaelmas daisies that have been developed by hybridization.

April and May of 1740 were busy months at "Thorndon." The seedling trees in the nurseries were thought to be mature enough to transplant, and the work of carrying out the plans for reforesting the untilled land north of the house at the height of land was begun with vigor. A six-foot cedar-of-Lebanon was placed on the highest point of the two mounds, that had been constructed at great expense; and four two-foot specimens surrounded the larger ones. The slopes were planted with junipers that had been raised from Bartram's seeds. The lower land below the Esplanade was planted with clumps of trees, scarlet and live oaks, and an Asiatic oak *(Quercus Cerris?),* hemlock and tamaracs, hackberries and tulip-trees. In all ten thousand North American trees were set out and twenty thousand European and Asiatic. The clumps were bordered with seedling flowering shrubs, dogwood, magnolias, osiers, and cherries.

The following year the nursery beds were replanted with silver fir seeds from the hills about Neuremberg, and the first successful shipment of mountain-laurel plants in boxes arrived from Pennsylvania and was set out.

The "Thorndon" household rejoiced that summer because a son and heir to the Petre estates was born on August 20.

In June 1742, Lord Petre went in to his London residence in the new area about Grosvenor Square. From Brook Street he wrote to Sir Hans Sloane, describing a recent thunderstorm which had struck two oak trees at "Thorndon." To Peter Collinson he sent some live fowl and other birds, asking him to put them on the coach for Brentwood and to instruct Gibbs, his man at "Thorndon," to release them in the menagerie; he apologized for being in town without calling upon him and pleaded a severe cold as the reason. The cold proved to be smallpox and, like his father, he died of it a few days later.

Lady Petre, now twenty-six years old and the mother of four young children, was named sole executrix of the Petre estate. What was she to do with the nurseries? An inventory listed 219,925 plants. Lord Petre's will, executed on June 30, two days before his death, directed that the timber in the nurseries be disposed of. This was a problem with which she would need help, and she received it from Collinson and from Philip Southcote, a cousin of her husband whom he had named as a guardian of his children.

Mr. Southcote lived in Surrey at "Wooburn Farm" on the west bank of the Wey River, near its junction with the Thames. He was the son of Sir Edward Southcote of "Witham Place," Essex, who had been a guardian of Lord Petre during his minority. Southcote turned to the landowners to whom Collinson had been supplying seeds and plants from Pennsylvania. These included the second Duke of Richmond, the fourth Duke of Bedford, the ninth Earl of Lincoln, the ninth duke of Norfolk, the third Duke of Argyle, and Lord Bute.

"Goodwood," on the Sussex South Downs, near Chichester, was being developed by the Duke of Richmond. The estate included St. Roch's Hill with an altitude of seven hundred feet, and other lower hills, all with fine views of the Solent and Portsmouth Harbor. In 1737, the Duke, like Lord Petre, had gotten from Collinson a share of the Pennsylvania seeds which he had received from Bartram, including oaks, hackberries, black walnuts, tulip-trees, white-cedars, junipers, tamaracs, and balm-of-Gilead fir. At the end of December, 1742, the Duke wrote to Collinson expressing his desire to have all the available cedar-of-Lebanon from "Thorndon," with which he wished to cover St. Roch's Hill, although he expected competition from his friends, the Dukes of Bedford and Norfolk. In addition he ordered one hundred white-cedars, not over four feet high. The following winter he ordered eighty tulip-trees from "Thorndon" and forty or fifty broad-leaved myrtles. He specified that the tulip-trees should be "well matted and taken with great care," and reported to Collinson a few weeks later that they had arrived safely and in good condition.

In Bedfordshire, the fourth Duke of Bedford was ready to start reforesting at "Woburn Abbey." He found some hills covered with beech and oak woods, while others supported only heather and broom, just as Lord Petre had found his fields in Essex growing heather and bracken. In the early spring of 1743 the Duke arranged to go with Philip Southcote and Collinson to look over the available material in the nurseries at "Thorndon."

"Worksop Manor" in Nottinghamshire, the seat of the Duke of Norfolk, had already made use of plant material from "Thorndon," in following Lord Petre's plan for the development of the Park. Junipers, hemlock, spruce, and mountain-laurel had been used, and the Duke added to the plantations year by year.

Lady Petre found that the liquidation of the nurseries was not an easy matter. The maintenance of prices in competition with the professional nurserymen was difficult and the results disappointing. She retained one Miller to superintend their care and installed him as master of Belzar's hatch farm on the western edge of the Park, near the nurseries. He was subsidized for caring for the material which the Duke of Richmond had purchased but left at "Thorndon," as only a limited amount could be transplanted each year.

The Duke of Richmond was correct in thinking that he would have competition for the material in the "Thorndon" nurseries. The ninth Earl of Lincoln also developed an interest in planting at "Oatlands Park," Weybridge, close by Philip Southcote's "Woburn Farm."

So it appears that the eighth Baron Petre's importation of plant material and trees from John Bartram helped to reforest Essex, Sussex, Surrey, Bedfordshire, and Nottinghamshire in the mid-eighteenth century. Later, when Thomas Jefferson had encouraged the Lewis and Clarke exploration of the Pacific Northwest, the flora of that region became known to Britain.

CHRYSANTHEMUM CULTURE (from page 186)
as parts (nutrients) per million (of soil). These systems do vary, but each system's recommended nutrient level readings work out quite well. For greenhouse use, where soil and water can be controlled, they are practical, for outdoor use, not so practical. However, experience has shown that certain unit values of fertilizers applied dry or liquid to the soil will produce satisfactory results outdoors.

The following fertilizer recommendations are offered for mixed or balanced formulas containing a 1-2-1 or a 1-1-1 ratio. A 5-10-5 or a 15-30-15 mixed fertilizer is an example of a 1-2-1 ratio; a 10-10-10 or a 20-20-20 an example of a 1-1-1 ratio.

FAST-ACTING fertilizers can be incorporated in the soil or applied to the soil in a dry form or as a side dressing. Applications on a moist soil and additional watering will help to dissolve and lower the fertilizer toward the root system. It may take several days or more before the effects of its availability is noticed.

Applications should start about a week or so before plants are put out and continue at six or seven-week intervals. One-half of the spring amounts should be applied as a side dressing until the flowers start to open, at which time applications cease.

As to the quantity to be applied: for example, three to five pounds of a 5-10-5 formula are recommended for one hundred square feet of soil area. The reason for stating three to five pounds is that the exact amount to be applied depends on your own judgment of how much fertilizer your soil may already contain and may be available throughout the season. Another formula with a higher or lower analysis would be adjusted proportionately.

The disadvantages or hazards in the use of these chemical salts in a dry form should be mentioned. (1) Some of these salts can produce by-products which may injure plants; watering well will reduce or eliminate this hazard. (2) Temperature influences the availability of plant food. Temperatures above 85° and below 50° can start a reduction or a stoppage of plant food.

To overcome such disadvantages, the following will be of some help.

RAPID-ACTING fertilizers are thoroughly soluble; therefore, available to plants within a short time (twenty to thirty minutes). Temperatures have less effect on this type of fertilizer than on other forms, but it is more susceptible to leaching if too much water is used.

Some of the earlier investigations with soluble fertilizers were undertaken to determine how and in what form plants absorbed their nutrient requirements. These investigations brought us the culture of hydroponics. By the early 1930's numerous chemical formulas were available for soil-less culture.

In the meanwhile, greenhouse operators, using soil to grow plants in, were also interested in these soluble chemicals. In the last half of the 1920's, the Elmer D. Smith Co., chrysanthemum growers of Adrian, Michigan, were using and selling a soluble fertilizer mixture called "Chrysaline," containing 20% N, 30% P, 12% K. They were also selling urea (46% N) with recommendations for careful use. The late Elmer D. Smith, dean of chrysanthemum hybridizers and growers, in his CHRYSANTHEMUM MANUAL (7th edition, 1930) wrote highly of "Chrysaline, using one ounce to fifteen gallons of water."

By the end of 1930, many investigations were in progress with soluble fertilizer chemicals. Some classic examples of these studies are: Dr. White at Ohio State Station using ammonium phosphate (21% N — 52% P — O, K); and Dr. Sayre at the Geneva, New York, Station, adding potassium phosphate (O-N-52% P-34% K) with ammonium phosphate in equal amounts to obtain 10%N — 52%P — 17%K mixture. Dr. Tetjian, at the New Jersey Station, came out with a number of different chemical mixtures containing a 13-26-13 formula, which was also soluble.

Not until the beginning of the 1950's was any great interest shown in soluble fertilizers. They are "big business" today and still growing with leaps and bounds. It has been estimated that in 1956 around 750,000 acres of farm land in Ohio, Indiana, Illinois, and Michigan used liquid fertilizers.

Considerable amounts of liquid fertilizers are also being used in the Southern States and on the Pacific Coast. Quite a number of mixing tanks have been put up by fertilizer dealers in the Middle West, to take care of this new business. Some of these dealers even have soil experts to test and recommend the formula best suited for the land and the crops to be grown thereon. The cost of liquid fertilizer has been estimated to be almost one-half the cost of dry fertilizer for the same area. There is not a great deal of difference in the price of the fertilizer; but the saving is in time, labor, and storage.

In commercial greenhouses, especially the larger organizations, the use of soluble fertilizers is a popular practice. The methods of application vary, of course. Some growers use tanks to control the flow of water to the benches; proper amounts of salts dissolved in the water tanks make fertilizing quite easy. A more up-to-date method is the use of injectors, which can be adjusted to deliver the desired amount of dissolved fertilizer to each gallon of water running through the water hose, while watering the plants. A suitable tank, containing concentrate fertilizer solution, supplies the injector.

These greenhouse methods are very efficient but somewhat expensive for small gardens. There is, however, a small unit which works on a vacuum principle. It injects one gallon of liquid fertilizer to each twelve to eighteen gallons of water coming out of the hose. This small unit is sold under the trade name of "Hozon" and costs around $2.25. You will probably find similar units under other trade names—they all work on somewhat the same principle. The operation is simple: attach "Hozon" to a connection in the hose or house water outlet, but not more than fifty feet away from the watering point. Turn water on and measure the quantity of water that comes out in one minute's time. This will vary with the size of hose and water pressure. Next, put a gallon of water in a pail and drop the end of the small tube attached to the "Hozon" into the pail. Turn water on and see how many minutes it will take to empty the pail. Multiply the minutes it took to empty the pail by the number of gallons of water coming out in one minute's time. This will give you the total amount of water required to empty one gallon of liquid fertilizer from the pail. As an example, assuming that your hose delivers two and a half gallons of water per minute and it takes six minutes to empty one

(Continued on page 196)

WINTER PROTECTION OF PLANTS

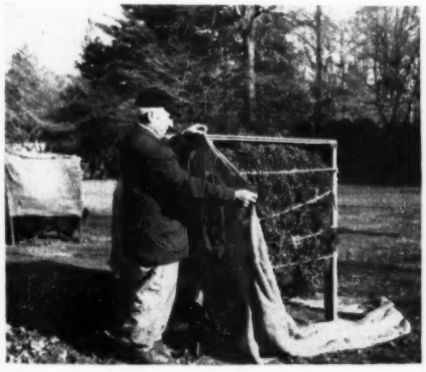
SOME WAYS OF ACHIEVING IT

By T. H. Everett

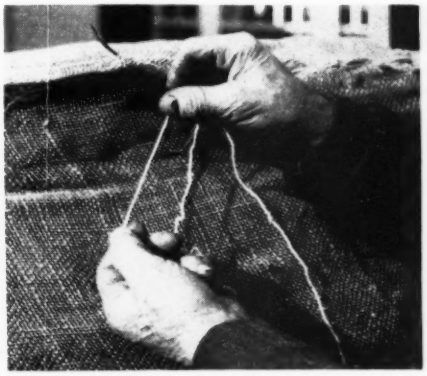
1. Protecting a boxwood. First, a wooden framework is erected around it.

Various methods are employed by gardeners to protect their plants from the harmful effects of winter weather brought about by strong sun, sweeping winds, excessive cold, and alternate freezing and thawing. Evergreens, particularly, are likely to suffer dehydration (evidenced by "winter burn" of the leaves) from excessive exposure to sun and wind. Slightly tender kinds and newly transplanted specimens are most susceptible. Appropriate protection may be afforded low-growing kinds by covering them with a layer of evergreen branches or salt hay. Taller shrubs and small trees may be cared for by erecting around them a wooden framework to which burlap is secured.

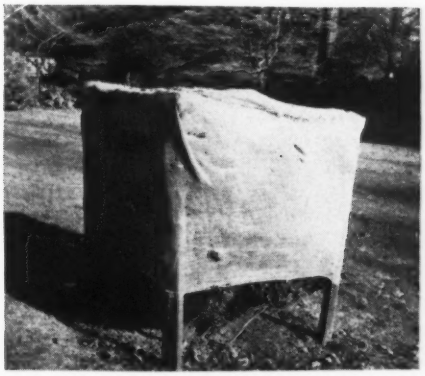
Protection from excessive cold that may harm the above-ground portions of non-evergreen shrubs and small trees is sometimes provided by wrapping the entire plant, after the leaves have fallen, in several stout layers of insulating material and then wrapping the outside of these with waterproof building paper or polyethylene film. The lower parts of the stems of rose bushes are usually protected by heaping soil around them to a height of from eight to twelve inches. This method may also be applied to other shrubs, such as the butterfly bush, *Buddleia Davidii*, and its varieties, that are likely to be killed back but will flower on new shoots produced from the base of the plant.



2. Burlap is then wrapped well around and over the framework.



3. Next, the edges of the burlap are sewed together where they meet.



4. The finished job. The boxwood protected from sun and wind.

The protection of the underground parts of plants from excessive cold is best achieved by mulching the ground about them with littery manure, straw, newly fallen or partly rotted leaves, peat moss or similar material.

Underground parts of deciduous herbaceous perennials are prevented from suffering undue damage from breaking of the roots by alternate freezing and thawing by placing over them a light covering of salt hay, dry leaves or of evergreen branches. Discarded Christmas trees form a worthwhile substitute for evergreen branches.

Winter protection of such plants as pansies and English wallflowers in coldframes often includes spreading a layer of salt hay over the soil in the frame as well as of rolling thick mats over the glass at night. The sides of the frames are sometimes insulated by building a framework of wood outside the regular frame and about a foot from it and filling the space between with straw, hay, dry leaves or similar material and capping it off with waterproof paper.

Inexperienced gardeners often make the mistake of applying winter protection too early and of removing it too early in spring. Soil and mulch materials used for this purpose should not be put into place until frost is in the ground to a depth of an inch or two. Burlap and other wrappings placed around branches should not be put on until really cold weather begins — which usually means late November or early December near New York City. Removal of coverings in spring should be done gradually and not until all danger of late severe weather has passed.

5. Above. One of the original plants of the Eldredge Holly (a variety of *Ilex altaclarensis*) at Great Neck, N. Y., protected by a tent-like covering of burlap. The open side was covered with burlap before harsh winter weather began.

6. Left. In the vicinity of New York, it is common practice for home gardeners to wrap and tie fig trees in burlap, old blankets, waterproof paper, and other insulating materials to protect them from excessive cold.

GARDEN TECHNIQUES

Separates are available of the articles in the series on garden techniques by T. H. Everett, being published in The Garden Journal: Lawn Verges; How to Force Dutch Bulbs; Some Sources of Humus; Tree Pruning Poin'ers; Sowing Seeds in Flats; How to Transplant; Some Fall Gardening Work; ten cents per reprint, any six reprints 50c.

Write for special prices on quantity lots for garden clubs, horticultural societies, institution, etc.

The New York Botanical Garden
Bronx Park New York 58, N. Y.

7. Salt hay is convenient to use and is sold in bales.

10. Above. Brushwood laid over salt hay prevents it being blown about by wind.

11. A light layer of salt hay affords shade and insulation to plants in cold frames.

8. Because it is weed free salt hay is especially useful for rock gardens.

12. Right. This coldframe has an outer framework of wood built around it with the space between packed with straw.

13. Below. Branches of evergreens or discarded Christmas trees provide effective winter protection for perennials.

9. A light covering of salt hay over young perennials checks damage by heaving during winter.

14. Tree leaves may be used as a winter mulch for evergreens and shrubs.

15. Littery manure is a good mulch to use around shrubs at the beginning of winter.

16. Soil, heaped around the bases of rose bushes, protects the stems from critically low temperatures.

CHRYSANTHEMUM CULTURE (from page 192)

gallon of fertilizer from the pail, this means a total of fifteen gallons of water. Now, if you are using one quart of water for each plant, the strength of the liquid fertilizer in the pail should be adjusted for sixty plants. This will work equally as well on a square foot basis, once the strength of the liquid fertilizer is determined. If plants require more water, put less fertilizer in pail. If plants require less water, put more fertilizer in pail—all proportionately, of course.

Recommendations for direct application of commercial fertilizer salts were based on pounds per one hundred square feet with a 5-10-5 formula or its proportional equivalent. With liquid fertilizers, ounces or spoonsful per gallon should be given, stating the number of plants it will cover.

The advantages of liquid fertilizer are more obvious with each passing year. It is simple to apply to soil and easy to regulate its strength. It is available to plants in cool or chilly temperatures when other forms may not be. It helps to control a steady supply of food for the plant requirements throughout the growing season.

The following recommendations are made for application at intervals of between one and two weeks apart. Shorten this period after heavy rains, because leaching will probably take place.

Of the many suitable soluble fertilizer mixtures, we shall use two of the formulas (15-30-15 and 20-20-20) that are quite popular in commercial work as examples for quantities to dissolve in water and amounts from this liquid given each plant. As nitrogen is more critical as a plant requirement and as it is susceptible to leaching, it is advisable to keep the percent of nitrogen in mind, more so than the other two elements, when measuring amounts to dissolve.

One ounce of 20-20-20 formula (two tablespoonsful) dissolved in one gallon of water is enough for sixty-four plants (two ounces to each plant). One and a quarter ounce of 15-30-15 formula (two and a half tablespoonsful) dissolved in one gallon of water should be sufficient for sixty-four plants. Both of the above quantities, dissolved in water, will give the same nitrogen strength. Other formulas, dissolved in proportional amounts, will be just as effective. (Check label for soluble fertilizer.) The 20-20-20 mixture is low in phosphate, so if your soil is deficient in phosphate (as the soil is in Westchester County) add four or five pounds per one hundred square feet to the soil in the spring. Several 20-20-20 balanced fertilizers are obtainable which contain trace nutrient elements that will be of help to those who use a great deal of peat moss.

For those who wish to water and fertilize their plants at the same time, a "Hozon" or a similar unit can regulate the flow of the gallon of concentrated fertilizer by the amount of water coming out of the hose. With "Hozon" attached, test your water line to see how much water it delivers in one minute, then how long it takes to empty one gallon of water with "Hozon" tube in it. (We have already mentioned that one quart of water will probably be enough for each plant.) Next, divide the amount of water expelled into quarts and that will give the number of plants it will water. With the knowledge of how many gallons of water it takes to empty one gallon of dissolved fertilizer solution, you are in a position to regulate the fertilizer solution for the most effective results. Again, using the example of fifteen gallons of water (for sixty plants) to empty one gallon of fertilizer solution, containing one and a quarter ounce or any other proportional amount of fertilizer; and assuming that the one gallon of fertilizer solution is emptied with twelve gallons of water (forty-eight plants), it is obvious that the fertilizer will be too strong. To overcome this strength, add more water to the fertilizer solution. In this case, use one gallon and one pint of water to dissolve the one ounce or one and a quarter ounce of fertilizer recommended. Where it takes eighteen gallons of water to empty one gallon of fertilizer solution, reduce the amount of water in the solution, still using one ounce or one and a quarter ounce of fertilizer. Any other volume of water required to empty one gallon of solution can be proportionately regulated.

Our own experience with soluble fertilizers since 1940 have been very satisfactory. We use them continuously on all our chrysanthemums as well as most other plants.

Before concluding the discussion on soils and fertilizers, I should like to

mention briefly several newer things that you may have read about or will.

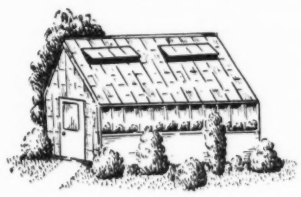
(1) Several years ago, there was quite a bit of publicity about foliar feeding of plants. Too much importance was attached to the value of this form of plant feeding, for it is still best and advisable to feed plants through their root systems. The only exception that may be allowed is when plants develop very woody stems, preventing the flow of water and nutrients up their stems. Plants grown properly will prevent woody stems and, incidentally, give better stock plants. In foliar feeding, it has been observed that nitrogen works upwards from the point of contact; phosphates and potassium go downwards as well as upwards.

(2) Urea form (38% N), a newer nitrogen fertilizer, containing a combination of urea and formaldehyde, was manufactured to release its nitrogen slowly. The disadvantages of this fertilizer is that in cool or chilly temperatures it will release its nitrogen quite slowly, but in warm temperatures it will release it fast. Regulating the steady supply of nitrogen for outdoor plantings would be quite a problem.

(3) Plant growth hormones, called "gibberellins," have been under study by Japanese scientists for over thirty years. They are produced by a fungus, *Gibberella Fujikuori*, and have, to some degree, been a problem with the rice crops in Japan—a plague, so to speak. U. S. scientists knew very little about "gibberellins" until a little over five years ago. Since then, a number of studies have been undertaken and several chemical structures formulated, showing some favorable action. A summary of the studies made by a team of Harvard scientists has been published in the ANNUAL REVIEW OF PLANT PHYSIOLOGY. The general action of "gibberellins" on plants appears to increase the carbohydrates.

Merck & Co. have put one of these chemical formulations on the market under the trade name of "Grebell Acid." Its use on chrysanthemums does not seem advisable at this time.

(To be continued)



"MEN AND GARDENS"—*A Review*

By Harold W. Rickett

SOMETIMES I have dreamed of writing a history of gardening. We already have, of course, the ponderous germanic scholarship of Marie Luise Gothein, and the pleasant browsing of Eleanour Sinclair Rohde. But these extremes, and the others between them, are not what I mean. Gardening, like other human (and inhuman) activities, is related to the society in which it occurs, and gardens reflect the lives of those who build them. A history of gardening should not only trace the changing aspect of gardens but also show how they mirror the streams of human living.

Since I am neither an historian nor a gardener, I suppose I shall never write that book. But now comes Nan Fairbrother with a title which seems to say just that: MEN AND GARDENS. She may be a gardener, though she lives in a London "terrace"; I doubt whether she is an historian, though she has a prodigious command of literature; but in any case she is a writer. She writes easily, fluently, with charm and wit (not to mention grammar). What a relief, after most of the horticultural and botanical books one reads!

Here are her opening sentences: "The Chinese have a wise saying which I once found in a book of proverbs—'If you would be happy for a week, take a wife: if you would be happy for a month, kill your pig: but if you would be happy all your life, plant a garden.' It is advice which reveals a high level of civilization with a low standard of living, but when I was a romantic young woman it seemed to me very shocking that the pleasures of eating should be considered four times as satisfactory as the pleasures of love. The Chinese, I felt, were wrong. But that was because I knew nothing about the eating."

A book of quotations can be tiresome. But this author does more than quote: she embellishes. She is not afraid of her own opinion, her own point of view. To me it seems strange that John Evelyn is found "unsympathetic," while Leonard Meager is approved; Meager was a relatively ignorant gardener who cribbed much of his stuff from Evelyn. But there is no argument about taste. And whether or not you agree with her judgments, she is a charming escort through selected writings of English authors from Thomas Hyll, Chaucer, Ben Jonson, Tradescant, Parkinson, Coles, and Bacon to Laurence, Gilpin, Bradley, Repton, Cowper, Pater, and many another.

Miss Fairbrother (or Mrs. McKenzie, as she is at home) begins conventionally enough with "Why Men Have Gardened." I confess to being unmoved by the raptures she quotes, and slightly disappointed that the real origins of gardening are rather skimped. With a surer touch "Enclosed Monastic Gardening in the Dark Ages" is described and accounted for; and "Enclosed Romantic Gardens of the Middle Ages" carry the story to the castles of medieval Europe. Then come the "Enclosed Fantastic Gardens of Tudor England," which were "not very different from the gardens of the Middle Ages, but only grown more confident." She describes their knots and arbors and beasts, their confined frippery, with real appreciation and affection, as any Englishwoman should. But her love is for the seventeenth century. Of a later literature she writes "Oh dear. There is nothing new, it seems, and the seventeenth century has said it all so very much better." It is true that she does not like Versailles: walks, parterres, vistas, all laid out on rational and geometrical principles; many fountains but no flowers. But then she brings us back to the noble parks and prospects of England, with the emergence of "landscape gardening," the incorporation of nature into gardens. Here also I feel a bit cheated. Miss Fairbrother does not tell us *why* the seventeenth century produced new kinds of gardens, nor *why* the English and French ideas were so different. Perhaps that history of gardens is still to write.

Then we reach the "Seats of Romantic Gentlemen. The Simple Life in Satin Slippers"—the eighteenth century. Here she does try to trace connections. "With a new subject we need lots of theories, one after the other, and as we pursue them and discard them we gradually get to know our material . . . It is only important to remember that our theories are only tools and not

(Continued on page 212)

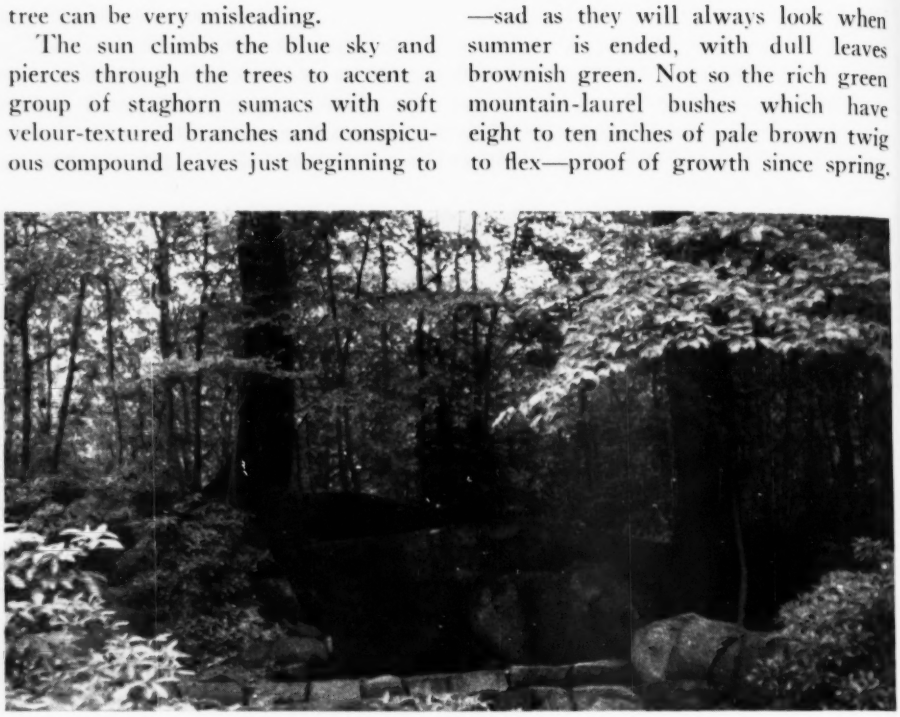
SEPTEMBER PATTERNS AT GREENBROOK

By Howard W. Swift

TAKE A SPARKLING, bright day with a clear sky, dazzling blue. The sun is just rising from the horizon and casting shadows stretched-out, dark and quiet — shadows that add distinctive stature to tall trees and to lesser plants. High in the canopy of mostly oak trees, green as in summer, the black tupelo or pepperidge-tree holds here and there a shining scarlet or deep red leaf—ruby-like in the searching light—as a first warning of cold weather ahead. Every leaf will be afire by the month's end. Still looking up, and observing the leaf patterns, it becomes evident that these are not just oaks. The skinny leaves, six times deeply cleft with sharp extremities spread like a flying squirrel, belong to the pin oak. Those with rounded clefts and little bristles have an outline which a too-vivid imagination might liken to the buxom feminine silhouette of the early 1900's. Obovate ones, but deeply eight-cleft, are white oak leaves. Even with the noisy blue-jays' demand for attention, a keen ear is alerted by the pattern of falling acorns, the impact of their fall often causing them to lose their caps. Acorns are good clues in identifying an oak, but associating an acorn with the wrong tree can be very misleading.

The sun climbs the blue sky and pierces through the trees to accent a group of staghorn sumacs with soft velour-textured branches and conspicuous compound leaves just beginning to change from green to bright autumn red. Anywhere but here these long, bare stems would surely look awkward.

Against bold tree trunks and the dense foliage of oaks, the scattered hemlocks look lacy and apologetic. Sad-looking, too, are the young basswoods —sad as they will always look when summer is ended, with dull leaves brownish green. Not so the rich green mountain-laurel bushes which have eight to ten inches of pale brown twig to flex—proof of growth since spring.



Above. Feature at the entrance to the Garden Club of New Jersey Arboretum near the sanctuary entrance.

Left. One of many beautiful trails at Greenbrook.

Swiftly the sun reveals an underplanting of seedling maples and beeches reaching upward, low blueberries, faded queen-of-the-meadow plants like tall spectres, dull maple-leaved viburnums blushing purple and bearing clusters of black fruits high on their upright stems, and wood-asters — all creating a symphony of quiet colors.

Over the ground through the high-branching oaks there are coarse and hoary heart-shaped leaves — all that's left of the large-leaf aster. Here, too, are plants of a smaller wood-aster in great profusion, with six or eight ray florets always in disorder and with unequal limbs; disk florets are soft lavender, blending subtly with the color of decaying oak leaves which make up the forest carpet. These last year's leaves have a fragmentary pattern. Soon with a new crop of fallen leaves, the pattern will be distinct again.

Black willows along one side of the lake.

In every direction there is poison ivy —its handsome, firm, trifoliate leaves turning to brilliant red, orange, and brownish purple. Where the plants climb, their color flashes against the dark of neighboring plants or against grey bark of a tree trunk. In an opening, the seasonal change in poison ivy is rapid and intense: leaves blaze for a few days and drop, exposing upright woody stems with few branchlets. Sometimes leaflets lose their hold even before their petioles and fall, leaving a stalk holding nothing — without purpose. On some of the woody stems clustered closely are tiny pale brownish green fruits resembling miniature gooseberries. These are persistent, and often clusters of last-year's fruit are evident, now tarnished grey, apparently food for no beast nor bird.

Prodding sunbeams suddenly intensify a cluster of fruit weighing down the limber stem of false Solomon's seal, shabby now and tired, with thin-textured browning leaves. Often among fruits the color of bright red cherries there are fruits flesh-colored and speckled — a few that are late ripening. Another spot of red — ah — all that's left of a perky Jack-in-the-pulpit. This knob of tightly packed berries at the end of a thin brown club that was the flower stem may have been tripped over by a hustling beast of the forest—enough to fell it.

Progressing along under the oaks, considerable areas are found where Virginia creeper has taken over. Here it is surprisingly effective, suggesting a much better use than climbing over wooden lattices or shingled roofs, as it has no respect for a carpenter's handiwork. Its leaves turn from dull tawny green to carmine. Long stems of these plants have threaded their way through the mat of brown leaves and only the petioles stand upright, except where a young stem has stretched out over an old fallen tree trunk, its hand-shaped leaves a delicate tracery. Where a plant has climbed a high-cut stump or climbed straight up the trunk of an oak, as though in too much of a hurry to go around — up to more sun — the leaves are flaming red.

And here is the limb of a white oak severed by summer storms. It still holds bunches of brown leaves at the ends of its branchlets, half-protecting clusters of shiny brown buds which look live enough to respond to returning spring.

Abruptly the oak forest is sheared off. Stark cliffs define a drop of a hundred feet or more to that narrow strip of land below, which borders the Hudson River. The water sparkles in the sunlight—and a black and red tug moves downstream, pulling eleven neatly-heaped barges of crushed stone. In following the tug's course as it makes its way slowly past, the outline of a wild grape interferes. Growing out along the branches of a dead maple which failed to survive the austerity of its cliffside habitat, a twining stem bearing rusty leaves hangs with clusters of blue fruits on red stalks. Bold against the silver background of the river is a curly tendril which has reached out for new holds—now wire-stiff.

Roadsides near the entrance to Greenbrook display the September patterns of sunny, open places. Here are communities of toad-flax with only a few last flowers near the top of each stem, a single evening-primrose opening its last pale yellow flowers that look even paler than usual in the harsh light of autumn. A tall thistle towers over

View of the lake from a nearby rocky knoll.

other wayside plants — a study in browns. The seeds with their silky down have been blown away, leaving a shiny tan involucre like some strange metallic flower. The lower leaves have curled under tightly, and the upper ones are still stretched out as they were to absorb the last bit of life-giving sun. Their segments are rolled in, exposing a lighter under surface. As the acanthus inspired artists to design the heads of Corinthian columns in Greek architecture, so might these leaves of a giant thistle inspire some work of man-made art.

A giant pokeweed stands like a privileged creature dominating a low fence. Through its mass of rich green leaves there is criss-crossing of amaranth-purple stems that split finally into tiny segments supporting long racemes of dark purple fruits shaped like flat little ridged tomatoes. On another pokeweed plant growing against a light yellow rock, stems and leaves alike have turned to a mad cerise. Lady's thumb grows in a moist spot, its tiny pink flowers squeezed tightly together at the end of long, reddish and jointed zig-zag stems. On stalks of tall nearby reeds, long, lateral blue-grey leaves spring alternately and large, shiny plumes of purplish-colored grass-flowers are held high. Most of our cultivated bamboos are far less beautiful.

Erect butterfly-weeds stand in the ripening grass and have upright slinky pods flushed rose. The mid-day sun emblazons one of many goldenrods—the rough-stalked — and calls attention to the perfect florets with which the gracefully-arching branches are studded, their tiny calices suggestive of a jeweler's mountings. Six or seven species flower at Greenbrook in September. Almost always goldenrods are associated with asters, either in woodland or in the open, and here are as many or more species of asters. To identify them with a manual is quite a challenge to beginning botanists.

Horse-nettles are much in evidence on dry banks, sprawling their prickly stems to make broad circles of green in the dying grass and bearing small green berries. Not far away the ground-cherry sprawls in a similar manner, but produces calyx-protected seeds in structures that resemble little green lanterns strung along the under side of their stems. In sunny spots and in the shade of roadside shrubs are groups of white snakeroot. It's nearly October when it is at its best.

A giant pokeweed near the entrance.

The turning earth changes the sun's early morning play. Shadows shrink and move uneasily. The light is less harsh. A roadway full of sunshine leads down toward the lake. Momentarily there is an awareness of singing crickets, occasionally an unexpected bird-call, the soft whir of traffic going north and south on the parkway, but man-made noises fail to be obtrusive.

Young dogwoods, now turning red, have been planted along the roadside, and male-berries, recognized by bark cracking into narrow strips. Their stems support rusty brown leaves with pointed red buds in their axils. They bear terminal clusters of new green fruit as well as persistent fruits of last year, broken open and empty of their seeds. Here, too, are young black haws with prominent opposite branches and small obovate leaves turning the color of blackberry juice, though green along the veins.

The sound of a gurgling brook in the protection of maples, sweet gums, and white ashes slows the pace for admiring a group of lush blue-green jewel-weeds, dangling a few pendant-like orange flowers, and a pink-flushed turtle-head, bending to catch its reflection in a pool of water.

Continuing, and observing the general appearance of this land dominated by trees in September, it is evident that woody plants display a greater individuality at this season than at most other times. Changing foliage, early defoliation of some individuals, bright colors of others, and the occurrence of conspicuous fruits here and there all tend to call attention to plants that when green create a much more even pattern.

There are tulip-trees and black birch

Bird watching is a favorite diversion in this quiet sanctuary.

with long, long horizontal lenticels like giant white stitches on the slaty bark, and grey birches with leaves no longer gay. A black locust standing alone flutters narrow, shiny leaves against the sky and a rustling cottonwood, hemmed in by high-bush blueberries, becomes all gold. Closer to the road, formidable blackberry bushes have become established in the company of poison ivy.

The open water of a fair-sized lake and its visiting birds all but deter farther exploration, but already the sun's position is a reminder of a shortening afternoon.

A narrow woodland path leads toward a hemlock forest and is quiet save for the sound of towhees scavenging in rustling leaves or the sharp cry of an excited jay. Here is a green dapple-shaded retreat with little fall color, except, once in a while, the bright yellow of a fallen dogwood leaf. By the path are ferns in variety, one after another: Goldie's fern, the marginal shield fern, hay-scented and interrupted fern—even some of those exotic-looking Christmas ferns with contorted leaves —a less-familiar form of the common evergreen which is still bright when found in the snow. A white baneberry has taken possession at one point, and its large grey-white fruits look ominous as they are solidly arranged on fat, wrinkled red pedicels the texture of sealing-wax. On all sides the undergrowth of maple-leaved viburnums. Japanese honeysuckle runs rampant over low shrubs, climbing up trees and tangling with wild grape vines. A few large hemlocks guard high ground at the northern end of the sanctuary, and fallen trunks are proof that only a generation or two back these beautiful living forest trees had many companions.

Paths descending through tall oaks and scattered hemlocks and beeches quickly lead back to the lake. Following around the shore, the plants by the water's edge include arrow-wood and more maple-leaved viburnums with black berries, which will remain way into winter and furnish birds with sustenance when more palatable food is scarce. Pinxter-flower bushes are here, also, and smooth alders from which dark green leaves fall without much change in color, exposing many little oval cones. A community of New York ferns changes to walnut-brown, while royal ferns are still rich green. White snakeroot likes this company, and its clean white flowers are conspicuous against a somber background. Black willows grow with their bases submerged in lake-water, making long shadows in the late afternoon sun.

A swamp developed along one side of the pond has become the home of cattails and rushes and arrow-leaved tearthumb which catches at trouser legs and nylons. With these are bright rough-stemmed goldenrod, broad-leaved arrowhead, and smartweed. The bullrushes with leaves like big pointed knitting needles make splashes of black-green among the other swamp growth and never concede to other plants. Nestled in wet moss are modest little sundews with pitcher-plants for neighbors, pitcher-plants with broad horn-shaped leaves veined conspicuously red. Shrubby highbush blueberries grow here and the red-fruited chokeberry; button-bush is included, too, with shiny leaves and the ends of its branches hung with fruit-balls that turn from green to red and eventually to brown.

A rapidly descending sun brightens the shoreline and sharpens gold and green reflections in the water. A pigeon-hawk sweeps closely, exposing bars of white across his tail. Leaving the lake and Greenbrook, the last impression is that of a green-necked mallard serenely swimming on the still water — and quietness.

Greenbrook Sanctuary is a section of Palisades Interstate Park approximately four miles north of George Washington Bridge on Route 9W. The tract of approximately one hundred fifty acres has been in the process of development by the Palisades Nature Association since 1946. For members, nature walks, field trips, lectures and study groups are arranged throughout the year. Many public-spirited citizens and local organizations have contributed to the work of the association. An artificial lake and bog area, as well as an arboretum section being developed under the auspices of the Garden Club of New Jersey, are special features.

For information concerning admission to the Greenbrook Sanctuary, contact Palisade Nature Association, Box 230, Englewood, N. J., tel. CLoster 5-1360.

A book entitled The Biotic Communities of Greenbrook Sanctuary, by Stephen Collins (1956-57, price $2.50, published by the Association) contains 112 pages of most interesting information on the history of the area, changes in the flora and fauna, as well as suggestions on development of the area. The book has sixty-four illustrations in black and white and a number of graphs and maps.

BETTER LILACS (from page 180)

complicates our selection of the best. For example, representing only a few of the more than one hundred and ten originators of lilacs:

Victor and Emile Lemoine, Nancy, France, introduced	214
Charles Baltet, Troyes, France	4
Jan Van Tol, Boskoop, Holland	1
G. Maarse, Alsmeer, Holland ('Primrose')	1
Ludwig Spaeth, Berlin, Germany	13
Rudolph Wilke, Berlin, Germany	1
Stepman de Messemaeker, Brussels, Belgium	10
F. L. Skinner, Dropmore, Manitoba, Canada	22
Isabella Preston, Ottawa, Canada	76
Hulda Klager, Woodland, Washington	61
T. A. Havemeyer, Glen Head, Long Island	41
Paul Dunbar, Rochester, New York	31
W. B. Clarke, San Jose, California (estimated)	20
A. M. Brand, Faribault, Minnesota	4
Edward J. Gardner, Horicon, Wisconsin	2
Dr. A. H. Lemke, Wausau, Wisconsin	1

Currently I have about one hundred and fifty varieties of lilacs under test—many in limited quantities, only one or two of a kind. I have not hesitated to discard a number. When a new variety is introduced, I am afraid that I shall miss out on something worthwhile so I fall for it. Is it better than any I now have? Time alone will tell.

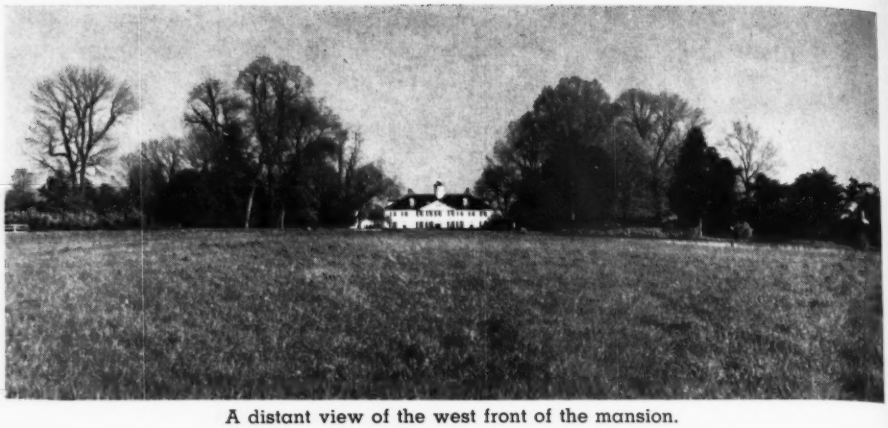
'Primrose' was recently introduced as a yellow lilac. One of the parents of 'Primrose' is 'Marie Legraye,' rated as one of the poorest whites. Maybe 'Primrose' will show a bit of cream-yellow. I shall see.

The task of selecting the better varieties would be much easier if only the best varieties had been introduced. LILACS FOR AMERICA, which came out in October 1953, gave a guide to the one hundred best varieties, but this publication will be out of date before I reach the point where I shall feel safe in discarding other varieties. In the meantime, a host of new varieties may further complicate the issue.

Following are the varieties I favor—listed according to color, with S for single, D for double. Readers of THE GARDEN JOURNAL may be interested in comparing my choice with the list of lilacs chosen by Dr. John Wister as among the finest at the Ewing Park Lilac Arboretum—see page 121, July-

(Continued on page 212)

The Editor Visits



A distant view of the west front of the mansion.

"Mount Vernon"

This was not our first trip to Mount Vernon, that beloved historical estate so "pleasantly situated," to quote George Washington's own words, on a hill-top overlooking the Potomac River and the low-lying hills on the opposite shore. But without doubt we learned more about the gardens and the plant material than we did on all our previous visits combined. For we were escorted by Robert B. Fisher, Horticulturist of the Mount Vernon Ladies' Association of the Union, who knows and loves every inch of the five-hundred acre tract of the "Mansion House Farm." He told us many fascinating details of the restoration of the gardens and some of the outbuildings, of digging into old records, as we roamed through the groves of trees, the landscaped areas, the spacious bowling green, and intimate gardens, all of which are separated from the surrounding fields by "ha-has" or sunken walls. Some of the trees flourishing on the bowling green were transplanted there from the adjacent woods under General Washington's direction — tuliptrees, hemlock, ash, mulberry, coffee bean, magnolias, hollies, and locusts. The last were preferred by George Washington, though he had a real appreciation of all trees and planted "groves of trees at each end of the dwelling house . . . . (pretty thick as they can at any time be thin'd)" . . . . .

"The Mount Vernon Ladies' Association of the Union has long been proud of its prudent policy in the care of the surviving original trees," said Mr. Fisher. "Periodic pollarding of the crowns of the large trees and adequate protection with lightning conductors have strengthened these trees against storm damage."

Mr. Fisher, pointing out a ridge on which grow some good-sized hollies, told us how General Washington had experimented with holly seeds; he had treated one batch in sand, one in sawdust, and one naturally, then sowed them along this bank of earth. Doubtless the trees alive there today were from some of these seeds. But which batch of seeds? No one knows, as General Washington didn't record the results of the experiment.

We noticed a willow growing in a mound, one on each side of the bowling green, and learned from Mr. Fisher that this is the very place General Washington had planted a willow. Being well above water line—and a willow likes water—the tree has never lived long in this situation. Modern underground piping has been resorted to, so perhaps the willows will now be happier on these two mounds.

The flower garden is on one side of the bowling green, the kitchen garden on the opposite. Boxwood is prominently featured in the flower garden—as parterres, as edging, and as background. George Washington quite likely became acquainted with boxwood as he traveled through the colonies, for it was brought to America in 1652. The first reference to boxwood at Mount Vernon appeared in the year 1785, in a letter from Colonel Henry J. Lee, Jr., in which an offer was made of "twelve horsechestnut, twelve box cuttings, and twelve dwarf box cuttings . . . . .," and according to General Washington's diary for April 13, 1785, the cuttings were received and planted. It is assumed that from these cuttings the extensive boxwood plantings at Mount Vernon were originated.

The previous year, 1784, General Washington began to build a greenhouse facing the north side of the flower garden, with servants' quarters on each end. Completed in 1789, the building was destroyed by fire in 1835. The present handsome structure, erected in 1951, was built after a study of documentary and physical evidence. The wings of the greenhouse contain

The flower garden at Mount Vernon.

four rooms for the servants' quarters, but further study of equipment and furniture is necessary before they will be ready for exhibition.

Washington's diary and other domestic records do not mention names of flowers grown in the garden. Entries read, for example, "Garden seeds planted in the 'upper garden,'" the flower garden being referred to as the "upper garden." So these gardens have been restored with perennials and annuals and roses known to have been grown then in Virginia gardens. As we wandered along the garden paths, the air was sweet with the delicious fragrance of the damask rose.

While Washington's diary and the weekly reports of the gardener omitted flower names, these writings carefully recorded the names of ornamental trees and shrubs and of fruits, vegetables, and herbs. Thus, the fruits, vegetables, and herbs growing in the restored "lower garden," the kitchen garden, are the same as were grown at Mount Vernon almost two hundred years ago. The training of fruit trees on walls—espaliers, and along the garden walks—cordons, in both the "upper" and "lower" garden was recorded also, so fruits are trained by these methods in both the flower and kitchen gardens.

As we entered the kitchen garden, our eyes were immediately drawn to a bed of head lettuce encircled with chives—the fresh green lettuce leaves a perfect foil for the lavender flower heads of the chives. We've never seen a prettier or more tempting planting. Do you suppose General Washington's gardeners were as skillful in producing such lettuce and chives?

The "lower" or kitchen garden at Mt. Vernon.

Walking in the direction of the lawn which stretches across the front of the mansion, we asked Mr. Fisher why the side walls of the covered lanes leading to the office and to the kitchen had been painted green, and we were told that reference had been found in one of General Washington's writings where he changed the color of the paint to green in order to show off the coral honeysuckle. And the green paint is, indeed, a much more effective background color for the honeysuckle flowers than white.

We looked for and sorely missed the holly tree that had stood thirty feet high on the lawn to the right of the beautiful mansion, when we first visited Mount Vernon a number of years ago. That was a day in late December; the ground was covered with snow, and the dark green foliage and red berries stood out sharply against the whiteness of the snow. The tree had been so superbly shaped and so fully berried—what had happened? It had been moved to the left side of the mansion eight years ago and had not at first taken kindly to the transplanting. But the tree is now putting forth new shoots and new leaves, and Mr. Fisher predicted that in another fifteen years it would be just as wonderful a tree as when we admired it twenty-five years ago. A large pecan, one hundred feet tall and with a twenty-three and a half foot trunk, that had been a neighbor of our favorite holly, had been uprooted by "Hurricane Hazel" in October 1954.

The many visitors including groups of students—Mount Vernon is a mecca for seniors in high school who arrive in bus-loads during May and June from as many as thirty-nine states in one year—had departed, leaving the mansion tranquil and quiet as we moved from room to room. The re-

The greenhouse—this structure replaced the original completed in 1789 and destroyed by fire in 1835.

storation of the banquet hall had been undertaken and completed since our last visit in 1947; the dark bottle green on the flat surfaces forms a lovely background for the designs in white in the friezes over the doors and the Palladium window pilasters.

As we were leaving Mount Vernon, Mr. Fisher called our attention to the attractive hedge of *Osmanthus ilicifolius* in front of "Little Hatchet Tavern," operated as a restaurant for the convenience of the public. Visitors mistake this for a holly hedge, because the shining green leaves, some of which have spiney teeth, resemble holly leaves as the specific name indicates. *O. ilicifolius* has fragrant white flowers. It is growing elsewhere on the grounds of Mount Vernon as a good-sized shrub.

"As the years roll by, not only the physical aspects of Mount Vernon—the mansion with its dependencies, the gardens and grounds—take on more and more of an eighteenth-century appearance, but the spirit of the place continues to retain much of the tranquility of that earlier age. The tides of men rise and fall, but the spirit of man remains—a bit of the Divine." These words have been taken from the last paragraph of the "Report of the Regent, 1953-1954," by Hope Powel Harkness, Regent of the Mount Vernon Ladies' Association of the Union, as they so exactly express our feelings about Washington's home.

"Dumbarton Oaks"

"Dumbarton Oaks" is now a center for research in Byzantine and Mediaeval humanities, owned and administered by the Trustees for Harvard University. Until 1940 it was the estate of Mr. and Mrs. Robert Woods Bliss, who conveyed the property to the University together with a library containing the most important books on Byzantine art and archaeology, also books on western European art, rare books and manuscripts on gardens and landscaping, and collections of mosaics, sculptures, paintings and other objects d'art. The collection is dedicated primarily to the minor arts of the early Christian and Byzantine periods and includes jewelry, ivory, silver, metalwork, and textiles.

My earlier visits to "Dumbarton Oaks" were made when Mr. and Mrs. Bliss resided there. It is situated on a hill in Georgetown, Washington, D.C., with sharp rises and falls in elevation, an unusual and beautiful piece of land but one that presented problems, especially of grading, in planning and planting gardens. However, Mrs. Bliss, with the assistance of the late Mrs. Beatrix Farrand, landscape architect of note, developed a series of charming gardens of carefully executed design and with interesting transition from one to another. These units are referred to as the green and white garden, the perennial garden, the pool garden, the rose garden, the Byzantine parterre. The last is a very small unit with beds of different shapes and sizes filled with pebbles and edged with ivy 'Rippling Wave.'

The several gardens vary in size, some quite small, none very large, and this is a factor in avoiding the monotony of terraces and in creating the overall distinctive effect. Further, the gardens are set off by a background of noble trees, copper beech, oaks, dogwood, redbud, locusts. Trees not only serve as background but as accents at strategic positions as, for example, two very fine specimens of the cedar-of-Lebanon.

We enjoyed our walk around "Dumbarton Oaks" in company with Matthew Kearney, Superintendent of the grounds and gardens. Mr. Kearney is another horticulturist who knows and loves every corner of the place entrusted to his care. He indicated several trees which as outside foreman he had planted twenty-five years ago and had watched attain their full development. He told us that the extensive boxwood planting had been reduced and that several changes had been made in the interest of economy, for with each garden up or down a flight of steps, maintenance is a serious problem; all tools, all garden equipment, all plants for replacement in beds and borders must be carried, not carted. We were very much impressed with an arbor being built by a cabinet maker of ebony, laminated and pegged, to hold a huge wisteria vine that had been a profusion of fragrant white drooping racemes several weeks earlier.

We strolled through the "Glen," which I had always regarded as one of the prettiest stretches of natural scenery, with the sound of water flowing over rocks, and a host of trilliums, foamflowers, Virginia bluebells, primroses, narcissi, scillas, and other spring flowers planted beneath the native shrubs and trees. Unfortunately, the "Glen" isn't as well kept as it used to be. It is a pity that the District of Columbia Park Department, to which Mr. and Mrs. Bliss gave these twenty-seven acres of their property, does not take steps to stop the rampant vines and shrubs from encroaching and choking out the more desirable plants. Some judicious pruning and weeding would do a lot to improve the condition of this picturesque area.

In 1956 the Trustees for Harvard University appointed a Garden Advisory Committee with Michael Rapuano

The rose garden at "Dumbarton Oaks"

as Chairman. The other members of the Committee are Alden Hopkins, Robert W. Patterson, Bradford Williams, and Leon Zach. The interests of this Committee serve not only for the maintenance and development of the gardens at "Dumbarton Oaks" but for the establishment of fellowships for individual study in garden design and ornament. A senior fellow in landscape architecture and two junior fellows have been appointed; the senior fellow is working on a publication on the history of landscape architecture and the two junior fellows are working part time in the gardens and the rest of the period of the appointment will be spent in visiting gardens in this area.

Over ten thousand people visit this beautiful estate every year—when you go to Washington, be sure to include it on the list of "must see."

Other Gardens

A quick walk through the "Bishop's Garden" at the Cathedral of St. Peter and St. Paul, Mt. Albans, Washington, D.C. (fully described by Nannette M. Strayer in the November-December 1955 issue of The Garden Journal), half an hour in the "Cottage Herb Shop" redolent with pot pourris and dried herbs hanging from the beams and in the Cathedral Shop (we wished we had more time to spend—the articles on sale were so enticing), and another quick walk through the Zoological Gardens.

The grounds are naturally lovely, tree-crowned hillsides and vales—it would be difficult to find a more attractive site for a zoo—and there is a remarkable collection of animals, birds, fish, reptiles. New parking facilities have been made, some of the structures housing the wild life have been built recently, but the cages and cases could —and should be given better care. Literally hundreds upon hundreds of children were being guided by teachers—from nursery school groups through upper classes; and on week-ends and holidays the zoo is overflowing with spectators. It's evidently a popular attraction among residents as well as visitors to Washington—so why the lack of attention to cleanliness?

Then we headed for the mountains of Virginia and West Virginia, with a diversion from our original itinerary to Upperville to say "hello" to Charles Pecora. Mr. Pecora, a former student-gardener at The New York Botanical Garden, is in charge of "Rokeby Farm," the country estate of Mr. and Mrs. Paul Mellon. It is a spacious estate, with acres of gently rolling pasture land, broad expanses of tree-shaded velvety green lawns, charming flower and vegetable gardens in the immediate vicinity of the dwelling, a fine strawberry bed and bush fruit, and a well-run greenhouse. The gloxinias were "out of this world"—clean and healthy, large-sized leaves and mammoth flowers of clear, true colors. One would have to seek far for gloxinias to surpass them.

Did we lose our interest in azaleas? No, we met them again in the Blue Ridge Mountains of Virginia and the Alleghenies of West Virginia and Pennsylvania — great patches of the pale to rosy pink flowers of *A. nudiflorum* and *A. roseum* and scattered groups of the pale yellow to flame flowers of *A. calendulaceum*. *Rhododendron catawbiense* was well represented; so was that exquisite flower, the mountain-laurel *(Kalmia latifolia)*. Now and then we caught the fragrance of the white blossoms of the false acacia or yellow locust *(Robinia Pseudoacacia)* and mile after mile we drove through areas heavy with the odor of honeysuckle.

As relaxation from too constant driving, we followed several nature trails, finding clumps of huckleberry *(Gaylussacia baccata)*, blueberry *(Vaccinium angustifolium* var. *laevigatum)*, and deerberry *(V. stamineum)*, the witch-hazel *(Hamamelis virginiana)*, and even ninebark *(Physocarpus opulifolius)* and the fringe tree *(Chionanthus virginiana)*, whose panicles of odd strand-like white blossoms have given rise to the common name, "old man's beard." Ninebark and fringe tree are rather out of place in an outcrop of catoctin greenstone on the side of a mountain, as they are "stream side or river bottom trees," but here they have apparently "put their roots in a down-mountain seep"—at least that is what the forest ranger suggested.

It was fun to see growing in the wild *Senecio aureus, Sedum Nevii, Chrysogonum virginianum,* and *Aquilegia canadensis*—not all in one location, of course—which we have grown in our rock and woodland gardens. The American columbine varied from eighteen inches high in some localities to a miniature alpine in the crevices of the rocks around Natural Bridge. And what an exciting moment to push aside *Rhododendron catawbiense* and to discover the dainty trailing arbutus *(Epigaea repens)* and to come upon the elusive Oconee-bells *(Shortia galacifolia)* on a rock ledge in a shady nook. When I told E. J. Alexander of the Garden staff about my shortia find, he reminded me that there are only a few stands of *S. galacifolia* known in the wild— near the North Carolina-South Carolina state line, so that the hand of man, not Nature, must have placed that plant gem where we found it.

"BOTANY FOR GARDENERS" (from page 179)

"double." The extra whorls of petals arise on the rim of the receptacle at the expense of the stamens; there is reason to think that even the petals normally present in the wild species are transformed, sterilized stamens.

A further development of the receptacle, and a puzzling one, is to be seen in an apple blossom. It is cup-shaped or vase-shaped, as in a rose. It contains only five carpels, more or less joined in the center to form a compound pistil (the styles, however, are mostly separate; five styles, each with its stigma). But the sides of the carpels and the sides of the receptacle are joined, so that it is impossible to say where one begins and the other leaves off: *receptacle and carpels form one solid structure.* It is this that later ripens into an apple, that fruit "with a good savour and merry" (as an old gardener wrote). The other parts of the flower seem to spring from the top of the ovary, just around the styles; for which reason the ovary is spoken of as "inferior" (below the other parts). In reality these parts grow from the receptacle which surrounds the ovary like an outer skin. All the other ovaries so far mentioned are "superior" ovaries — they are clearly situated on the extremity of the apex.[11]

11 More technically, the type of flower formed on an apple tree is called epigynous (**epi**, Greek, meaning "upon"; **gyne**, also Greek, meaning "woman", "female"); what we have in a rose or cherry is perigynous (**peri**, "around"); and all other types are hypogynous (**hypo**, "under"). This is naming the types of flowers from the point of view of the stamens and perianth rather than that of the ovary. The ovary is superior or partly so in perigynous and hypogynous flowers, inferior in epigynous flowers.

BOOK REVIEWS

GARDENING INDOORS UNDER LIGHTS. Frederick H. Kranz and Jacqueline L. Kranz. 241 pages, illustrated, indexed. Viking Press, New York. 1957. $4.95

A waggish philosopher has said that civilization takes away the good things of life and gives us substitutes almost as good and far more expensive. So in this book an enthusiastic couple experiments indoors in winter with the Department of Agriculture's Beltsville technique of high intensity artificial illumination, up to 1600-foot candles, for long daily periods, up to eighteen hours. That this is possible is a credit to the electrical industry.

Their construction methods were primitive and may be invalidated by even newer light sources. However, they have done a service by pointing the way to these higher levels of illumination and by, generally, respecting the light meter and the timer as the criteria of dosage, though some enthusiastic passages present discrepancies. Humidity, on the other hand, is very casually treated and nowhere quantitatively considered, so that their results may not repeat themselves.

Most of the volume relates their botanical and horticultural adventurings, indicating great avidity as collectors and a veritable gluttony for the acquisition of knowledge the hard way. It is an interesting, highly individual record, even flirting with horticultural heresy in suggesting that the *Begonia semperflorens* hybrids may possibly vie with the sacrosanct saintpaulias!

VICTOR GREIFF
Neponsit, N. Y.

CORN AND ITS EARLY FATHERS. Henry A. Wallace and William L. Brown. 134 pages, illustrations, bibliography. Michigan State University Press, East Lansing. 1956. $3.75

The authors, true to the title, lead off with a description of the corn plant, particularly the parts which produce the pollen and the ear of corn. Technical terms are avoided as completely as possible in this section as well as throughout the book. In the next few chapters the importance of corn past and present in all parts of the world is discussed. The latter two-thirds of the book are devoted to short statements of the contributions of the many men who labored in corn field and laboratory to mold the relatively unproductive corn of the past into the highly profitable hybrid types grown presently.

One of the most interesting chapters concerns the "Forgotten Corns;" in pre-hybrid corn times, a great number of corn types were grown with exceedingly differing qualities of stalk and ear. Then in the period which culminated in the development of hybrid corns, many of the earlier forms were lost completely and many others are rapidly becoming extinct. The authors emphasize the necessity of maintaining in cultivation as many of these "forgotten corns" as possible; "So-called 'forgotten corns' may actually be the reservoir from which will come our corn for future generations. The 'forgotten corns' are a kind of insurance which may well enable the breeder to cope with unexpected changes of many kinds."

The only very serious criticism of this book is that the subject is of sufficient breadth of interest that it could have been treated more in detail; the reader may often wish for more information on some of the topics treated rather superficially.

RICHARD S. COWAN, *Assoc. Curator*
Div. of Phanerogams
U. S. National Museum
Smithsonian Institution

THE UNDERWATER GUIDE TO MARINE LIFE. Carleton Ray and Elgin Ciampi. 338 pages, illustrated by Teiji Takai; indexed. A. S. Barnes, New York. 1956. $8.75

This book is primarily prepared as a manual for skin divers. The naturalist reader will be excited chiefly by the fresh approach offered in the first section of the book where the authors give an underwater picture of the shore zones of North America. They give a brief but accurate popular description of the principles of oceanography, physics, chemistry and biology, "the sea as an environment for life." There is an interesting section on underwater photography with detailed discussion of equipment. (The illustrations in the text attest to the authors' skill in this area.) The section continues with a description of the dangers a skin diver may encounter and concludes with a general discussion on evolution and classification. Two items of interest to the reviewer are a very practical and eloquent plea for marine conservation, which appears in the introduction, and an exceptionally well-chosen bibliography recommended for further reference for the serious student of marine life.

The main portion of the book contains a comprehensive coverage of the marine plant and animal life one is likely to find on the west or east coast of the North American continent. Because of the scope of classification attempted, the authors chose to represent a family or order of fish by a careful choice of common representatives as "types" for the larger unit. The time-consuming (if more accurate) taxonomic devices of the laboratory have been relegated to a subordinate position and a system involving silhouette, scale pattern and color, and movement such as "quick, flitting, and altogether birdlike" or slow and sluggish is used with considerable effectiveness.

The authors' chief love is obviously for the vast assemblage of fish, since they treat the algae and invertebrates to a rather brief but accurate review of fifty-five pages, while fish require one hundred eighty-nine pages of well-written, often fascinating, fish-eye view description. Almost, it makes this reader wish to try aqualung and face plate and go see for himself—but not quite!

WESLEY N. TIFFNEY
Sharon, Mass.

PLANTS OF THE BIBLE. A. W. Anderson. 72 pages, illustrated with color plates. Philosophical Library, New York. 1957. (Printed in Great Britain.) $6

"Fascinating!" is the most appropriate adjective I can think of to describe this little book. While only twenty-six of the two hundred and forty-two species of plants identified in the Bible are treated in this work, they are discussed in a most charming, interesting, and accurate manner. One could only wish that the author had included more, because the remainder has equally as many interesting stories to be told.

The author quotes liberally from Theophrastus, Herodotus, Pliny, Dioscorides, Parkinson, Tristram, Strabo, Post, and other early writers on the lore of ancient plants, and the quotations make magnificent reading. He also draws liberally on old English—and even Egyptian—history and tradition, always in a very relevant manner. His discussion of the balm-of-Gilead, cinnamon, cassia, and other Biblical spices is the most fascinating that it has yet been my pleasure to read.

In connection with the Biblical "apple," he points out that before the seventeenth century almost any fruit was known as an "apple." Among the other contributions to the subject are his identification of the "gourd" of Jonah 4:6-9 as *Lagenaria leucantha,* rather than *Ricinus communis,* and his statement that the "flax" of Exodus 9:31 was more probably *Comelina sativa,* a plant commonly grown in that area for its edible seeds.

Of particular interest to students of Biblical botany are the author's apparent identification of all the "manna" of the Bible as being from *Tamarix mannifera* and the "thorns" of the Crucifixion and of Isaiah 33:12 and Ecclesiastes 7:6 as *Poterium spinosum.*

Unfortunately, the editing of the manuscript and proof-reading have left something to be desired, because the text contains many typographical errors and mistakes in spelling, such as *"pseudo-acorus"* for *pseudacorus, "agallochium"* for *agallocha,* and *"siliquestrum"* for *siliquastrum.*

The twelve magnificently colored plates are taken from standard works by Plenck, Redouté, Guimpel, Bayer, Hart, and Bauer and should do much to make this book extremely popular with the lay public.

HAROLD N. MOLDENKE
Director, Trailside Museum
Watchung (N.J.) Reservation

COUNTRY FLAVOR COOKBOOK Haydn S. Pearson. 225 pages. Published by the author, Sunny Hill Farm, Greenfield, N. H. 1957. $3.50

It is seldom that a garden writer is asked to review a cook book, and this is my first attempt; but this cook book is different and therefore a pleasure to do. For many years I have known the writings of Haydn Pearson and sensed vaguely that he was "up in the hills" somewhere and that he not only knew his stuff but also could write beautiful, clear English. I have never met Mr. Pearson, but have recently exchanged letters with him; I know that he lives in southern New Hampshire, has a two-acre orchard and garden and a charming old farmhouse, writes a column for a Boston paper, and is a former "school man."

I gather that he has a comfortable living, a pleasant environment, and that he likes to do a little cooking as well as gardening and nature study. As a writer I would place him pretty well up towards the top, a bit like Burroughs and Thoreau but saltier. And he is garden-minded.

So when I heard of COUNTRY FLAVOR COOKBOOK, published a few months ago

and privately distributed, I requested a copy for review and promptly received one, autographed by the author and with a photograph of Mr. Pearson, his wife, and their charming old homestead. Mrs. Pearson is given most of the credit for the recipes; she was born in Quebec and her name was Blanche Elliot. Many of the recipes have a Scotch-English background but with New England overtones.

Mr. Pearson has a sweet tooth and leans towards cookies and puddings, but he also relishes any kind of good country cooking including chowders, stews, pies, cakes, soups, also "Uncle Thaddeus' Tomato Rice," and "Blanche's Bran-prune Muffins."

Every text page contains a recipe or at least a reference to eating or cooking "country style," but half of the content is devoted to charming and amusing little essays on such themes as "Seed Catalogue," "Long Ones" (underwear), "Pie for Breakfast," and "Parlor Organ." Most of them are more horticultural than this brief list suggests. The whole book is a delight to read and while some recipes may seem a bit rich, or perhaps a bit casual, anyone who can cook can figure them out and will enjoy trying them. There are 225 pages, plus space for notes; 115 recipes and 70 essays—and the combination is irresistible.

ANDREW S. WING
Book House
Riverside, Conn.

1957 YEARBOOK NUMBER OF THE HEMEROCALLIS JOURNAL. 210 pages. American Hemerocallis Society, Daisy Ferrick, Secretary, 416 Arter Ave., Topeka, Kansas. $3.50 a year.

The intense interest in hemerocallis is reflected in the broad scope and thoroughness of the articles contained in the 210-page, 1957 Yearbook issue of The Hemerocallis Journal.

As with all hobby plant societies, papers dealing with comparative merits and regional performance of varieties form an important segment of this neatly printed book. More to the point, however, is the fact that a surprising per cent of the membership is engaged in breeding and introducing new varieties, as evidenced by the list of hundreds of varieties which were registered with the society during 1956.

This book offers considerable assistance to those interested in breeding day-lilies. A most thorough article, "Hybridizing Principles," by C. C. Wiggams of the University of Nebraska, reviews the general principles of heredity. Following this, he presents a digest of articles on hybridizing hemerocallis which have appeared in the Society's yearbooks of the past ten years on breeding aims and ideals, selecting parental stock, techniques of breeding, chances of success, and evaluating results.

Some of the foremost breeders are contributors to this issue as, for example, Dr. E. J. Kraus of Oregon and the late Dr. A. B. Stout, curator emeritus of The New York Botanical Garden. Dr. Kraus points out that colors vary in intensity, depending upon the soil and climate. Most reds, he says, are brilliant when the plants are grown on an acid soil rather than on a slightly alkaline one. In the cool regions of western Oregon, he reports, many of the reds appear as a rather dull mahogany. Thus, Dr. Kraus tests his own seedlings in the Midwest as well as the West Coast before naming and registering them.

Dr. Stout had made an exhaustive study of the fundamental features of doubleness of flowers of day-lilies, and the problems involved in breeding for doubleness, which is republished here.

For those planning succession of bloom in their gardens, Karl K. Lorenz has selected varieties which gave thirteen weeks of bloom in 1956. For those who are color conscious, Rev. E. W. Minks selects his favorites in various color classes. They include melon-pink 'Multnomah;' polychrome 'Painted Lady' and 'Prima Donna;' apricot 'Capri' and 'Golden Galleon;' bicolor 'Howdy;' rich purple 'Royal Purple;' red 'Crimson Glory;' rose-pink 'Pink Damask;' salmon-pink 'Evelyn Claar;' orange 'Aten;' golden-yellow 'High Noon;' lemon-yellow 'Limonero;' and near white 'North Star.'

PAUL F. FRESE
White Plains, N. Y.

THE NEW ENGLAND VEGETABLE GARDEN. Samuel Ogden. 144 pages, illustrated by Hamilton Greene; indexed. A. S. Barnes & Co., New York. 1957. $4.95

The title of this book would begin more accurately with "A" instead of "The," since it is an account of the author's individualistic method of running a large vegetable garden to produce supplies for summer visitors and others in Vermont. Location and purpose doubtless are the reasons for his summary treatment of such items as asparagus, rhubarb, melons, winter squash and herbs, to which no more than a passing reference is given.

Mr. Ogden has become addicted to the so-called organic gardening, and with the usual intolerance. Apparently he spurns the soil scientist, the plant physiologist, and even the plant breeder, as his varieties are far from up-to-date and he seems not to know of hybrids, even in sweet corn. Seed treatment, insecticides, fungicides, and all such scientific developments find no place with him except perhaps for scorn.

He does not raise his own seedlings and therefore omits this part of gardening which to some is as interesting as it is valuable. The reader will also look in vain for information on mulching, on harvesting and storage in either pit or freezer, on foliar feeding and other modern arts. But it is a cheerful, self-confident book within its limitations, admirably produced by the press and very free from typographical errors, though "maddock," on page 49, is a novel spelling for the old clod-breaker.

A note of special commendation is due to Hamilton Greene for the design of the volume and the admirable black and white drawings with which, in addition to photographs, it is enlivened.

F. C. COULTER
Orange, Conn.

JOHN MUIR FATHER OF OUR NATIONAL PARKS. Charles Norman. 191 pages, indexed. Julian Messner, New York. 1957. $2.95

We are indeed indebted to Charles Norman for a delightful insight into the life of a true "giant" amongst natural historians. Most of us are vaguely familiar with or aware of some of the achievements of John Muir, but this book about the "Father of our National Parks" truly opens our eyes to the great vital capacity of this beloved Americanized Scotsman. Somehow in each one of us frustrated naturalists there is a dormant adventurer's spark that is often, through circumstances beyond control, kept smothered for most of our lives. I am sure that other readers of this book will share with me the sense of liberation and companionship that Charles Norman has created. I for one strode through the wooded mountains of our country, and froze on eternal snow-swept glaciers with John Muir and a little dog, and somehow participated in his naturalist's excursions through the magic of the written word.

Not many men of the past few generations will be immortalized with living memorials that have become indestructible monuments to their memory. Somehow destiny picked the right time in human history for the crossing of the paths of trees that sprouted thousands of years ago and a benevolent "old man of the mountains." Without John Muir to wage a mighty fight (truly, the pen is mightier than the saw) we might not have many of our forests and National Parks today. Thousands pay homage to his memory when they visit the Muir Woods National Monument in California. The giant redwoods he loved are mute but eloquent remembrances of a man that did great things for the unborn citizens of our great country.

To help us understand the human side of a great man, the chapters on his early life and aspirations, his marriage and family life reveal a few intimate secrets of the sentimental John Muir. The traveler Muir is well established in the tales of his world-wide peregrination always in quest of trees, plants, and knowledge.

The closeness of the bond of past and present is revealed in the linking of Muir with Emerson, Burroughs, Cleveland, T. Roosevelt and other greats. In fact it was a pleasant surprise to read that on one of his many trips, he had as a companion and adviser none other than our own Governor of New York State, the Honorable Averill Harriman, who, as a small boy accompanied his father on the Harriman Alaska Expedition.

Suffice to say, the name John Muir should be better known by all Americans of today

Books are Choice Christmas Gifts —

Books are the best gifts — they are a personal selection for another's personal interest and, above all, are a constant and useful symbol of friendship. The books reviewed this month—and those reviewed every month—in The Garden Journal, on botany, horticulture and kindred subjects, will make choice Christmas gifts.

BOOK SERVICE

THE NEW YORK BOTANICAL GARDEN

Bronx Park, New York 58, N. Y.

and tomorrow, and Charles Norman has accomplished this in his very readable book.

A must for all visitors to our National Parks!

THEODORE KAZIMIROFF
Bronx Historian and Naturalist

JOURNAL OF RESEARCHES BY CHARLES DARWIN INTO THE NATURAL HISTORY & GEOLOGY OF THE COUNTRIES VISITED DURING THE VOYAGE OF H.M.S. BEAGLE UNDER THE COMMAND OF CAPT. FITZ ROY, R.N. 489 pages, illustrated, indexed. Heritage Press, New York. 1957. $5

The Charles Darwin Journal is more or less a classic. To be brief, I quote the first paragraph of Chapter I:—

"After having been twice driven back by heavy south-western gales, Her Majesty's ship BEAGLE, a ten-gun brig, under the command of Captain Fitz Roy, R.N., sailed from Devonport on the 27th of December 1831. The object of the expedition was to complete the survey of Patagonia and Tierra del Fuego, commenced under Captain King in 1826 to 1830—to survey the shores of Chile, Peru, and of some islands in the Pacific — and to carry a chain of chronometrical measurements around the world . . ."

It is a very handsome volume — long octavo, with excellent printing to invite the reading. The book is nicely bound in tan buckram with a good design, and is in a slip case.

I wish that Charles Darwin had had more of a sense of humor than he displays in the writing of his Diary. As a small girl, I remember a copy of this book on my father's library shelves and reading some of it, but I confess I had not read it again until this copy came to me — and I have read it twice.

Charles Darwin seemed more interested in geology than in flora. He was interested also in the habits of marine animals and one is amazed to find that they spent so much time on land collecting specimens. It was truly a "voyage around the world," and it lasted from December, 1831 until October, 1836—five years.

One of the most dramatic episodes is that of March 4, 1835, when he entered the Harbor of Concepcion, in which he describes an earthquake of overwhelming power. Darwin remarks "Earthquakes alone are sufficient to destroy the prosperity of any country . . ."

He seems to have enjoyed Brazil—and who could not enjoy that lovely country, whether in 1835 or in 1939 as I did.

Darwin visited mines wherever they were available—he slept in country houses hither and yon. Chile and Peru were to him tremendously interesting countries. He liked islands—each one different from the other—and the curious animals that were indigenous. So many of these islands and South American countries are so accessible now by air, particularly the Island of Haiti, Darwin's description of which was read with great delight the other evening by one of my friends who had spent some time there. He also visited the Island of St. Helena, where Napoleon was exiled — and he describes "Longwood," the home in which Napoleon died.

One thing that would never leave the mind of Darwin was his visits to the slave countries. That part of the diary is not very attractive reading. I think he was very glad to get back to England but he deeply enjoyed the Voyage—five years is a long time to be away.

The notes occupy twenty pages and are extremely interesting — and the index is good. The illustrations by Robert Gibbings are apparently wood-blocks and many of them quite delightful — only a few of flowers but many of animals.

RACHEL MCM. M. HUNT
Pittsburgh, Pa.

THE OPEN SEA. Alister C. Hardy. 335 pages, illustrated, indexed. Houghton Mifflin Co., Boston, Mass. 1956. (Printed in Great Britain.) $6.50

This superbly illustrated small book on the organisms which drift or move about in the sea is typical of the comparatively non-technical series in which it appears. It is admirably adapted to the needs of the general biologist seeking a highly readable account of plankton, its environment and its place in the food cycle of higher marine life. Even biologists quite familiar with the sea will find it informative and most enjoyable. Briefly introducing the more general features of oceanographic significance, such as currents and maritime seasons, Professor Hardy illustrates the types of apparatus used in obtaining data on the physical environment and for collecting the plankton itself. There is little offered on the chemical nature of the environment and its relation to the plankton. The plant constitutents, the base on which the whole biological structure depends, are dismissed in eighteen pages, though the coverage is neither adequate to their importance nor completely accurate. The animals, group by group, larvae and adults, are described in their general characters and for the part they play in the biological association generally. This is done with the greatest enthusiasm and in charming style.

The photographs, mostly by the distinguished biological photographer, Douglas P. Wilson, are excellent, made under all the inconveniences of working aboard ship, and they are equalled by the fine reproductions of water-color sketches made by the author himself from life.

The facts that the book carries on to the level of the smaller deep-water fishes, and the giant squid, and that a discussion of phosphorescence carries over to the photophores of deep-water fishes, only add to the attractiveness of the work.

The book is, of course, designed for a British public and so deals mostly with the North Atlantic. This probably excuses the fact that the bibliography is heavily biased, being nearly limited to works in English and chiefly those by British authors, in spite of the general title.

WILLIAM RANDOLPH TAYLOR
Dept. of Botany
University of Michigan

SUNLIGHT ON THE LAWN. Beverley Nichols. 255 pages, with drawings by William McLaren. E. P. Dutton, New York. 1956. $3.75

Those of us who read and enjoyed MERRY HALL and LAUGHTER ON THE STAIRS will find a special delight in SUNLIGHT ON THE LAWN, for we are re-introduced to many of the intriguing characters with whom we first became acquainted in the earlier volumes.

One feels that nowhere but in England could be found this lovely old house and garden with the devoted gardener, who works untiringly from dawn til dusk, and the man-servant, who shares Mr. Nichols' love for cats—incidentally, there are many fascinating episodes for cat lovers scattered through the story.

We again meet Our Rose, who believes in faith-healing for flowers in distress; and Miss Emily, who vehemently protests that a real gardener needs muddy fingers rather than a "green thumb"; Miss Mint, who has such a dreadful time when she rents "Oakapple Cottage" to quite the wrong sort of tenants, and Marius, who provides an endless supply of apt quotations about sundials, and stories from the classics about every kind of plant ("Marius is so erudite"). There is also the enchanting story of a search for a sundial, which ends in the purchase of a stone balustrade weighing several tons! Later comes the acquisition of eight shrapnel-scarred Doric pillars from a Regency crescent at Dover, which had lived through the battle of Britain to be finally erected in a semi-circle around the pool and be known facetiously to Mr. Nichols' intimates as Stonehenge.

A great store of gardening information gathered from practical experience adds substance to a book that is filled with whimsical humor. It is fittingly illustrated with characteristic sketches by Willie McLaren of wide-eyed, innocent-looking cherubs upholding miscellaneous urns, fountains, and cornucopias.

This book about "Merry Hall" apparently will not be the last, for does not Mr. Nichols himself end by saying, "Well . . . you have been warned!"

RUTH E. WILSON
South Orange, N.J.

PLANT PROPAGATION IN PICTURES. Montague Free. 249 pages, illustrated, indexed. American Garden Guild and Doubleday, Garden City, N. Y. 1957. $4.95

Until comparatively recently, the so-called secrets of the art of plant propagation were jealously guarded by the people exercising this craft. This may seem almost medieval to those who are engaged in more progressive industries where information is pooled, where problems are discussed, and help generously given when needed. And indeed, it is medieval, for the practice goes back into the dim reaches of history when life was much more of a struggle than it is now. These customs die hard; but, in recent times the falacy of this approach has been appreciated by progressive growers everywhere and it is now the custom, rather than the exception, for a person to be warmly welcomed should he visit a knowledgeable grower, friend, or a commercial establishment—to look over what is going on and to discuss the problems of the day. The immeasureable advances which have followed from this free exchange of information can hardly be estimated and, as a result, the so-called secrets of plant propagation are becoming secret no longer and the keen gardener is beginning to realize how much his gardening pleasure can be enhanced if he starts right from the beginning with a seed, a cutting, a graft and raises plants that please him from the ground up, so to speak. With each passing season, the miracle of creation is placed in his or her two hands and to the keen grower, this is a never-ending panorama of astonishment and pleasure.

But, because of the influence of the old-fashioned, close-mouthed reticence, it may sometimes be somewhat difficult for the keen amateur to obtain precise information

(Continued on Inside Back Cover)

NEWS, NOTES and COMMENTS

Excerpts from The President's News Letter September 1957

Redesigning of the Rose Garden worked out very well and through fall there will be an excellent showing . . . at this time (September) there are magnificent displays of water-lilies, hardy and tropical, and dahlias.

The Youth Program is proving a successful and worthwhile project. Fifty children grew flowers and vegetables this summer under the direction of T. H. Everett. Five hundred youngsters worked in the Hobby Club. Boy Scouts have regular meetings at the Garden and two courses for Girl Scout leaders were given. The proceeds from a "White Elephant sale" will help to support the Youth Program.

10,000 tulips will be planted this fall in the Conservatory courtyard for display next spring . . . these are the gift of the Associated Bulb Growers of Holland.

The nineteenth expedition to the remote areas of Venezuela left on August 25, headed by Dr. Bassett Maguire. The National Science Foundation and the Forestry Colleges of Yale and Syracuse Universities are participating in this expedition for extended investigation in wood technology and timber products. The Explorers' Club is supporting the geographical phase, and The Eli Lilly Company is underwriting the investigation of new plants as possible drug sources. Parke Davis and Company, Johnson Motors, and the F. W. Woolworth Company provided the expedition supplies.

Lie Giok-Liong of the Government Botanic Gardens of Bogor, Indonesia, spent two weeks in the Library. Here on a three-year fellowship, on a nation-wide study of botanical and agricultural libraries, Mr. Giok-Liong was sent to the Library by Dean Martin of the graduate School of Library Science of Rutgers University.

Dr. Richard M. Klein has received a grant from the American Cancer Society for Study of the "Etiology of Crown-Gall Tumor Cell Formation."

Miss Biruta Eimanis, who has been serving as Dr. P. P. Pirone's research assistant, has entered the graduate school of Pennsylvania State University to work for her Ph.D.

Mrs. Gutherie Shaw and Mrs. John E. Parson are supervising the permanent plantings in the approach and entrances to the Conservatory. This project is supported by the newly established Advisory Council Fund.

In the Christmas House Show, sponsored by the Volunteer Associates, each house or apartment will be decorated in keeping with Christmas legends by local garden clubs. The sale of cakes, Christmas decorations, etc., will be held in the auditorium of the French Institute Building. Mrs. James C. Brady is in charge of houses, Mrs. Melville E. Sawin of decorations, and Mrs. Herman D. Ruhm of the sale.

Miss Alice Chauncey, Mrs. John Donaldson, Dr. Henry T. Skinner and T. H. Everett are the speakers for the January Downtown Lecture Series.

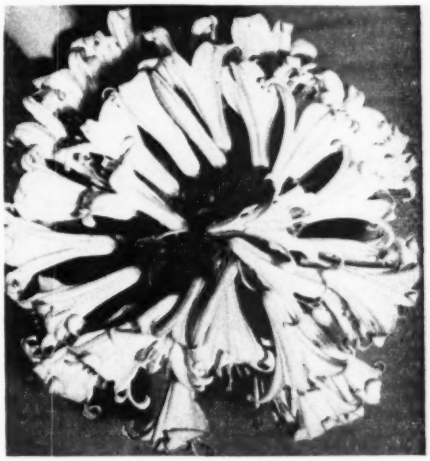
IN MEMORIAM EDWIN DE T. BECHTEL

Edwin De T. Bechtel who passed away July 4, 1957, became a member of the Board of Managers September, 1943, and of the Executive Committee January, 1944, in which capacities he served until the time of his death. Mr. Bechtel, a lawyer by profession, had a wide range of interests; he was considered an authority on etchings and specialized in the work of Jacques Collot, a seventeenth century French graphic artist, about whom he wrote a biographical monograph. He was especially qualified for service with The New York Botanical Garden because of his great knowledge and interest in horticulture. In this respect the rose and its culture commanded his main attention and he wrote and lectured frequently on the subject.

All through his association with the Botanical Garden Mr. Bechtel showed a marked interest in its affairs, besides being a most generous contributor to its various funds. Beyond this, however, the memory of his cheerful, kind, lovable qualities and high character will ever be an inspiration to his many friends.

RESOLVED that this tribute of respect to our late associate be entered in the minutes of this meeting of the Board of Managers of The New York Botanical Garden, October 11, 1957, and a copy sent to Mrs. Bechtel with the deep sympathy of the Board of Managers.

Dr. David D. Keck, Assistant Director and Head Curator of The New York Botanical Garden, attended the meetings of the American Institute of Biological Sciences held on the Stanford University campus, August 25-29. While there he served on the council of the American Society of Plant Taxonomists and on an advisory committee to the Recreation and Park Department of San Francisco. He also utilized the opportunity to confer with Dr. P. A. Munz, co-author with him of a California Flora that has just been turned over to The University of California Press for publication. The completed manuscript exceeded four thousand typewritten pages, and it is hoped that the volume will appear in 1958.



Stalk of regal lilies carrying thirty-nine blooms in two concentric rings—in the garden of Marion L. Hubbard, Carmel, New York. Mr. Hubbard has had the bulbs many years, possibly twenty, and they have been moved twice—the last time, four years ago. He has given them no special care, but the quantity of blooms on one stalk is amazing.

A Really Aged Yew. When Dr. William J. Robbins, Director of The New York Botanical Garden, visited the new botanical garden at Meise, Belgium, a year ago, Professor W. Robyns, its director, told him about a very old yew growing at Lo in West Flanders, known as Caesar's yew. "According to an old legend, Caesar once attached his horse to this tree!"

In September of this year, Professor Robyns sent Dr. Robbins seeds of this yew, expressing the hope "that they will germinate so that you can have in your garden offspring of this historical tree."

Ceasar's yew at Lo in West Flanders.

Wayside Gardens 1958 Introductions. Anchusa 'Lodden Royalist,' a form of the well-known anchusa 'Dropmore' was shown for the first time at the 1957 Chelsea Show, where it was unanimously awarded a first-class certificate. An English garden writer reports as follows on the promising novelty: "It grows no more than three feet high and carries its multitudes of large, luminous blue flowers on sturdy, freely branching stems. Its raiser, who has introduced many good plants, rates this as one of the very best of them all. I have watched this excellent plant progressing through its trials and feel that it has an assured future. It was well launched, with a unanimous, and for once thoroughly deserved, Award of Merit and is definitely a plant to be obtained."

Wayside Gardens will introduce to the public the flowering crab-apple 'Red Jade' which originated in the Brooklyn Botanic Garden. It is semi-weeping in habit. The numerous blush-white blossoms transform this small tree into a tree of sheer beauty in spring, and the brilliantly-colored fruit make it a sensation in the fall.

The hybrid musk rose 'Robinhood,' originated by Pemberton in 1927, is a perfect hedge rose. Its growth is densely compact, and its foliage, deep green. As are all hybrid musk roses, 'Robinhood' is resistant to common rose ailments. The cherry-red flowers are produced freely in clusters early in the season and again, sparingly, during late summer and autumn. 'Robinhood' is not particular as to soil, can be cut to any height over three feet and up to five feet or more, and is easily propagated from cuttings. A hedge of two-year-old test plants withstood temperatures of

several degrees below zero without dying.

Wayside Gardens is also offering two new dwarf Oregon asters, 'Bonny Blue' and 'Persian Rose'; several new hybrid dicentras, 'Debutante,' 'Paramount' and 'Silversmith'; two new day-lilies, 'Apollo' and 'Heleos,' of the same blood line of 'Hyperion'; and *Geranium Endressi* 'Wargrave Pink.' The last, a plant for a warm sunny spot, bears a profusion of clear pink flowers from June to late September.

Frans Verdoorn, Managing Editor of the Chronica Botanica Co., and Secretary of the International Biohistorical Commission, of Waltham, Mass., U.S.A., has been appointed Director of the new Biohistorical Institute of the University of Utrecht, the Netherlands. This institute, now being set up in conjunction with Professor Lanjouw's Botanical Museum and Herbarium, will concern itself with the cultural, historical, other humanistic and related aspects of the pure and applied life sciences, with some special reference to the plant sciences. It will be located in a building at 187 Nieuwe Gracht, bordering on the Utrecht Hortus Botanicus, formerly the residence of Profs. Miquel, Went Sr., and Koningsberger.

Born in the Netherlands and originally a cryptogamic botanist (Ph.D., Utrecht, 1934), Dr. Verdoorn later engaged mainly in editorial and international relations work. After moving to the U.S.A. in 1940, particularly influenced by the Sargentian heritage of the Arnold Arboretum (then directed by Dr. E. D. Merrill) and George Sarton, his main interests turned gradually to the borderlands between the natural sciences and the humanities and he gathered an extensive documentation covering botanical biography, the history of botanic gardens, the Linnaean period, etc., which will now form the nucleus of his new Utrecht Institute.

The publication programme of the Chronica Botanica Co. (with the exception of certain biohistorical publications to be issued in the Netherlands) will be taken over by the Ronald Press Co. of New York City, on October 1, 1957, both as to most current and forthcoming titles. Dr. Veerdoorn, who established and has edited *Chronica Botanic* since 1935, will act as Consulting Editor, while John A. Behnke, Science Editor and Vice-President of the Ronald Press Co., will develop a *Chronica Botanica* division which will publish forthcoming volumes of *Chronica Botanica* and related serials.

American Hemerocallis Society — twelfth annual convention at Shamrock-Hilton Hotel, Houston, Texas, May 15-17, 1958. Gardens to be visited are those of Mr. & Mrs. F. Mell Thomas, Mrs. John E. Green, Mrs. A. S. Parks, Mrs. James T. Sedden, Mrs. Robert W. Schlumpf, and Mrs. W. W. Wood; also the Russell Gardens, famed for day-lilies, in Spring, Texas.

The famous weeping Higgin cherries outside the camellia house at "Planting Fields."

A NEW ARBORETUM ON LONG ISLAND

"Planting Fields" in Oyster Bay, Long Island, was given to the State of New York upon the death of William Robertson Coe in 1955. At the present time and until a new campus is created at Stony Brook, Long Island, the new State University College on Long Island is sharing the facilities at "Planting Fields" with the State University Agricultural and Technical Institute at Farmingdale. Under the direction of the Farmingdale Institute, a new arboretum is being developed at the former Coe estate.

The Coes' generous gift was deeded to the State of New York to be used primarily

Boxwood path leads from the main house to the Japanese hydrangea pool garden.

for the study of ornamental horticulture, agriculture, and other allied fields. As a matter of fact, Institute classes have visited "Planting Fields" for the past twenty years to study its plants and gardens. In his will, Mr. Coe provided an endowment fund to be administered by Planting Fields Foundation to aid State University in the improvement and expansion of the arboretum, which is to be used for the State University's educational program and for the benefit of the public.

In January, 1957, the Planting Fields Foundation appropriated funds for the employment of a horticulturist and other personnel to inventory, map, record, and label the existing plantings, and to aid in developing new plans for the arboretum. For the past seven months this work has been progressing under the able direction of Gordon Jones, a graduate of Cornell University, class of 1943. Foundation funds will also be used for aerial photographs and contour maps. With the permission of State University, the firm Innocenti and Webel was commissioned to prepare preliminary plans for the revision and expansion of the arboretum as an educational facility.

Plans for this fall include the revision and additions to the plantings in the vicinity of the main house in order to create the synoptic section of the arboretum. It will include, for the most part, deciduous trees and shrubs not now represented in the arboretum. Plantings will be arranged in interesting landscaped groups rather than in rows. Later, other areas will be developed to provide more complete collections of woody plants which are hardy for landscapes in this plant hardiness zone.

Since 1910, Mr. Coe had assembled a fine collection of plants from all over the world, devoting one hundred and sixty acres of the four hundred acre estate to this purpose. During the last decade, thousands of visitors viewed the spring splendor of his famed rhododendron and azalea plantings. Large mature trees add to the beauty of spacious lawns; the cedar of Lebanon, the blue Atlas cedar, the copper beech, and the silver linden are but a few of the noteworthy specimens. All were transported to "Planting Fields" after they had reached an impressive maturity.

The main greenhouse and the camellia house cover approximately one acre and contain unusual collections of anthuriums and other tropical and sub-tropical plants. The orchid collection contains several hundred cattleya hybrids and many cymbidiums, cypripediums, and vandas. The notable camellia and hibiscus groups are also housed in special sections. Some areas of the greenhouse are planted in commercial florist crops, in order to provide practical laboratory experience for students majoring in floriculture.

Considerable rehabilitation of the greenhouses and their heating systems has already been accomplished. By spring 1958, a classroom-laboratory addition to the rather small head house building will be completed and will also provide offices for members of the faculty. State University has renovated several buildings necessary for the establishment of State University College on Long Island.

The future plans for the arboretum are designed to insure an informal landscaped atmosphere in contrast to some of the older arboretums which were developed on the row and plantation system. Mr. Coe made an unparalleled beginning for this arboretum. Planting Fields Foundation, together with State University of New York, is now working to develop these plantings into one of the finest arboretums on the East Coast.

ROBERT C. DAVIDSON
Evening and Extension Division
Agricultural and Technical Institute
Farmingdale, New York

A Lavender Rose. Conard-Pyle of West Grove, Pa., will introduce in 1958 a new floribunda rose, 'Lavender Girl,' developed by Francis Meilland, the noted French hybridist. The buds are a ruby-red; as the flowers open, the inside of the petals assumes a rose-purple tone, the outer surface a magenta. The color of the fully open flower is described as lavender, this color holding even in strong summer heat.

Mrs. Grafton H. Pyne, a member of the Advisory Council of The New York Botanical Garden since October 16, 1946, and a member of the Corporation of The New York Botanical Garden since January 15, 1947, died August 14, 1957. Mrs. Pyne, who was also an annual member of the Garden, was a descendant of John Pelt, first lord of the manor of Pelham, New York. She was active in civic affairs, and in the Red Cross. Mrs. Pyne is survived by four sons, Grafton H., Percy R., Eben W. and John W., a daughter, Mrs. Alison Ewing, and a sister, Miss Anna Wright.

Betty Blossom, garden editor and writer, died on September 21, 1957, at the age of 48. She was the wife of John Johnston, garden editor of The New York Herald Tribune, and widely known in horticultural circles, having been garden editor of House and Garden and director of The Cleveland Garden Center. Miss Blossom had contributed several articles to The Garden Journal of The New York Botanical Garden. She was recently honored for "her many contributions to the field of horticulture as an editor and writer," when she was presented with a silver bowl, the International Flower Show trophy.

Dr. Arlow B. Stout died at his home in Pleasantville, N.Y., on October 12, 1957, at the age of eight-one. His obituary will be published in the next issue of THE GARDEN JOURNAL.

Archie Thornton died at his home on October 19, 1957, at the age of sixty-three. Mr. Thornton, a graduate of the Royal Botanic Gardens in Kew, England, was a horticultural lecturer and writer. He had been an instructor at the Lowthorpe School of Landscape Architecture and also an instructor in the Educational Program of The New York Botanical Garden.

Federated Garden Clubs of New York State, Inc., Course III for Flower Show Exhibitors and Judges, was held at The New York Botanical Garden on October 16, 17, 18, 1957. Mrs. Loren R. Dodson, Mrs. Edward Lee Alexander and Mrs. George J. Hirsch were the instructors in flower show practice, flower arrangement, and color emphasis, respectively; T. H. Everett, Curator of Education and Horticulturist of The New York Botanical Garden, was the instructor in judging potted plants, fruits and vegetables and gave a demonstration in point scoring. Mrs. Milton A. Hescock was chairman, Mrs. David Kirschenbaum, vice chairman of the Flower Show School Committee.

Errata. The sentence on page 173, line 6, of the September-October 1957 issue of The Garden Journal, should read: When Dr. Marshall Howe was named Acting Director, following Dr. Britton's retirement in August 1929 . . . Dr. Britton died June 25, 1934.

LET THERE BE HERBS

Have you seen the charming Christmas cards made with dried leaves and flowers of the Holy Land? They are imported from Bethlehem, Jordan, no doubt handicrafts of the Christians there. The pressed leaves and petals are firmly attached to white cards imprinted with the words, "Blessed Christmas."

In examining these little works of art, it was interesting to see that single petals of the bright-colored flowers gave the effect of whole blossoms in proportion to the fern-leaved herb used as a miniature tree, to which they were adornments. Also no trace of glue could be seen through the paper, though leaflet and petals were firmly attached. Each card had a slightly different combination of colors, but the basic design was similar in all of them.

The faint aroma and delicate tracery of the leaves suggested that they might have been from one of the chamomiles. Petals were of roses, pansies or violas, violets, larkspur, buttercups (in the case of the latter, three whole blossoms were included). On one card a buttercup flower was superimposed upon four red geranium petals to give an effect of a whole flower.

The question of how the tissue paper-thin flowers were fastened to the cards without any spotting or changing of the natural colors or bumps in the back of the card became a challenge. I had to try making some. Thus began a good deal of fun with pressed herbs and flowers.

It was in December, last year, that I found the cards so the choice of leaves and flowers to dry for making my own was limited. In the herb garden I found chervil, sweet woodruff, and dead nettle still green. A friend brought me blossoms of Christmas cactus which, when dissected, yielded lovely pink petals which pressed well. Florists' pink, red, and yellow carnations, African violet flowers, and petals of chrysanthemums provided brilliant colors with which to deck my own tiny Christmas tree cards.

Since that time a wealth of spring and summer blossoms have been pressed for future designs. Pansies, roses, pinks, larkspur, poppies, delphiniums, bluebells, buttercups, calendulas, geraniums, phlox, and violets have been dried flat between pieces of "Kleenex" and laid among the pages of magazines or books. The wild flowers were more likely to be pressed whole, while the large petaled garden ones were separated. In any case, blossoms were picked as soon as possible after opening so that the base of the calyx containing the ovary should not begin to swell with ripening seeds. Violets and pansies, which have a thickened end to the flower funnel, were usually clipped at the base of the sepals.

Several kinds of glue have been tried. For the most delicate petals, egg white applied with a thin artist's paint brush proved the best. If the flowers and leaves were to be arranged upon a package, "Ducco" cement or Franklin's "Evertite" glue proved

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very satisfactory. Their only drawback—they have a strong odor. This dissipates, if the package is left in the air; but for cards to go in an envelope, it is not so good. However, for package decorations or old-fashioned dried bouquets mounted under glass in a picture frame, the strength of the glue is more important that a slight odor from it.

Decorating a package, wrapped in plain white tissue or shelf paper, with pressed petals and leaves is lots of fun. No ribbon is necessary, if flowers and herbs supply the adornment. Using the three dimensional method of drying sprays of flowers in borax provides extra excitement for package prettying.

One of our correspondents takes bits of lace, pleats them, and puts the bottoms through a slit in folded pieces of card stock or heavy paper. A bit of glue is applied on the inside of the cards where the stems of the fans of lace come through. Then blossoms of thyme, rue, lavender, and any other small flowers which have been dried in borax to retain their shape, are arranged in the baskets formed by the lace. Here again a touch of glue on the stems would hold them more securely for placing in envelopes. What crushing takes place when the cards are mailed only serves to release the scent of the herbs. Fresh sprigs of sweet geranium blossoms and leaves could be used in winter, as they would be pressed while traveling.

Sweet woodruff with its delightful whorled leaves and delicate scent of new mown hay makes excellent pressed greens. Ferns and all the cut-leaved herbs, pyrethrum, wormwood, chervil, sweet cicely, and tansy keep a bright green. There are several plastic sprays such as the one used by florists to coat the leaves of house plants which can be used to help retain the green color of greens before or after pressing. Here is a new field for experimenting. The fun of such floral art is in discovering new techniques for oneself.

GERTRUDE B. FOSTER

"MEN AND GARDENS" **(from page 197)**

truths." Good advice for most of us! "The eighteenth century is the Classic Age. Yes, but that is no help with its romantic gardens. The Age of Reason. I dare say, but it plays at the Simple Life like a child playing at being sophisticated. The age of fashionable follies. Yes. And for the moment (and since it is my own theory) I can think of no buts." She treats the follies with English humor, at times waspish, generally good-natured.

Victorian England is, strangely, passed over almost without a word; perhaps because "the noble race of English eccentrics has sadly declined since Walpole's day, for besides a changeable climate and a tolerant government, it needs a considerable income, which he never mentions. They are an irreplaceable loss, these wonderful exotic creatures who wither in the chill winds of income tax and death duties, and Sir George Sitwell [1909] is probably the last gardener who will encourage us to put our statues under water so that they look like mermaids."

The last chapter is titled "What Do We Want Now?" We pass from the amusements of the Great to the hobbies of Ordinary People—suburbanites like you and me. What do we want in our gardens? Since we cannot plant parks, we grow flowers. We "have added new discoveries from the East, and used our new knowledge of genetics to improve the old favourites—or sometimes, alas, only to coarsen the elegant distinction of the original species to a gross display of formless colour." Nan Fairbrother seems here a bit at sea—as we all are nowadays. She tries out various ideas. "A place to grow flowers. Yes, but that does not describe a garden so much as a floral allotment." On one page a garden is "an ideal place for men to grow old in"; this does not square very well with the garden as a place for the children to play in. Perhaps all this, which is charming enough, is the introduction to another book: I hope so. In my view, the modern garden, at least in the United States, is as confused as the society which has produced it: masses of often ill-assorted and garish colors imported from the public parks; the informal planting suited to acres compressed into seventy-five by one hundred feet; a power-mower to crop a pocket-handkerchief of lawn; and the labors of Hercules instead of the restful enjoyment of beauty.

Here is the end of a rarely delightful book: "I went down to look, and found under the willows a square of trampled grass fenced in with old boards, and inside, a pile of grass cuttings, some breadcrumbs, and a jam-jar brimful of water. But not a sign, alas, of even the smallest frog. Only on the highest board was written in white chalk capitals: 'GARDEN FOR FROGS.' Though who was meant to read it I never have decided."

MEN AND GARDENS. Nan Fairbrother. 271 pages, illustrated. Alfred A. Knopf, New York. 1956. $5

BETTER LILACS **(from page 201)**

August 1957 issue of THE GARDEN JOURNAL.

I. WHITE
- Edith Cavell D
- Ellen Willmott D
- Marie Finon S
- Vestale S

II. VIOLET
- Marechal Lannes D
- Violetta D

III. BLUE AND BLUISH
- Duc de Massa D
- Firmament S
- Maurice Barres S
- Olivier de Serres D
- President Lincoln S

IV. LILAC
- Jacques Callot S
- Leon Gambetta D
- Victor Lemoine D

V. PINK AND PINKISH
- Charm S
- Katherine Havemeyer D
- Lucie Baltet S

VI. MAGENTA (OR REDDISH PURPLE)
- Capetaine Baltet S
- Congo S
- Glory S
- Marceau S
- Paul Thirion D
- Reaumur S

VII. PURPLE (OR DEEP PURPLE)
- Adelaide Dunbar D
- Edmond Bossier S
- Ludwig Spaeth S
- Monge S
- Mrs. W. E. Marshall S
- Night S
- President Roosevelt S

VIII. EARLY HYBRIDS
- *oblata dilatata S*
- Assessippi S
- Buffon S
- Catinat S
- Louvois S
- Pocahontas S
- Mirabeau S

IX. LATE HYBRIDS
- Coral S
- Hiawatha S
- Isabella S
- Lutece S
- Royalty S

• Have you a friend who would enjoy the privileges of membership in The New York Botanical Garden?

• Why not tell him about them—or if you prefer, please send his name to us and we shall be glad to mail him literature describing the privileges of such membership.

• A member of The New York Botanical Garden also has the satisfaction of contributing to the advancement of the botanical and horticultural sciences.

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THE NEW YORK BOTANICAL GARDEN
Bronx Park, New York 58, N. Y.

INDEX
THE GARDEN JOURNAL

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DOROTHY EBEL HANSELL
Editor

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TITLES AND SUBJECTS

*indicates illustrations

A European Rose Circuit* 39-41
A Fragrant Garden for the Blind* 33-35, 53
A Garden of Ten Million Bulbs* 42-43
A Martius Relic* 129-131
A New Arboretum on Long Island 210
A Noteworthy Euphorbia* 122-123
A Plant Doctor Grows Roses* 113, 131-132
A Report on the Colloque International* 69-72, 75
A Visit to California Gardens and Gardeners* 144-147, 163
Advisory Council 30
Amazon Valley, The Challenge of the* 90-91, 95
American Association for the Advancement of Science 30
American Fern Society 29
American Hemerocallis Society 210
American Rock Garden Society 29
American Rose Society 138
Annual Meeting 135
"Any Other Type, Any Other Color" 162-163
Arbor Day Association 67
Argyroxiphium gymnoxiphium 29
Asiatic Crabapples — Dual Purpose Ornamentals* 187-188

Bamboos. Their Economic Future in America* 124-128, 131
Bartram, John and Thorndon Park* 141-143, 152, 189-191
Bechtel, Edwin De T. 173
Bechtel, Edwin De T., in Memoriam 209
Begonias 68
Begonias are Fascinating House Plants* 7-9, 12, 13
Beneficial Secrets of Nature* 156-159
Blind, A Fragrant Garden for* 33-35, 53
Blossom, Betty 211
Bonsai, New Jersey* 13-14
Book Reviews 25-26, 30-32, 63-65, inside bk. cover March-April; 96-99, 103, 104; 133-134, 138-140, inside back cover, July-August; 171-172, 174-176, 206-208, inside back cover, Nov.-Dec.
Books for the Younger Generation 174-175
"Botany for Gardeners"* 177-179, 205
Brittonia Accepted as Official Organ of the American Society of Plant Taxonomists 66
Bronx Women's Auxiliary of The New York Botanical Garden 136
Bulbs, A Garden of Ten Million* 42-43
Burlingham, Gertrude S., Scholarship 29
Busman's Holiday* 1-4, 14, 36-38, 41-42

Cedar Brook Park Iris Garden* 76-77, 81, 95
Children's Plant Workshop and Flower Show 66
Chrysanthemum Culture, Outdoor 153-155, 170-171, 184-186, 192, 196-197
Chrysanthemums, My Experience With Japanese* 24
Coffin, Miss Marian Cruger 67
Colloque International, A Report on* 69-72, 75
"Compositions in Seaweed" 66
Crabapples, Asiatic, Dual Purpose Ornamentals* 187-188

Daffodil Show, Second Annual Connecticut 67
Daffodils, English and Irish* 54-55
Dahlia Show inside back cover, Nov.-Dec.
Daylilies—and Dr. Stout 136
Dear Fred* 151-152
Dedication of Research-Laboratory Building of The New York Botanical Garden 27
Dodge, Dr. B. O. 137
Dogwood Borer, The* 49
"Dumbarton Oaks" 204-205
du Pont, Henry Francis 135
Durand, Elias 105-108, 123, 132
Dwarf English Ivy* 82-83

Edgerton, Edna Fisher, Memorial Wild Flower Garden 138
English and Irish Daffodils* 54-55
Errata, 68, 211
Euphorbia, A Noteworthy* 122-123
Ewing Park Lilac Arboretum* 119-121
Excerpts from the President's News Letter 135, 209
Exhibit of Water Colors 66

Federated Garden Clubs of New York State, Inc. Course III 211
Federated Garden Clubs of New York State, Inc., School of Landscape Design 176
Fellowships in Conservation 138
Flora Beauty, Jamaica, B.W.I. 103
Flora of the Northeastern United States, French Botanists and* 105-108, 123, 132
For Beauty: Lilies* 109-112, 123
French Botanists and the Flora of the Northeastern United States—J. G. Milbert and Elias Durand* 105-108, 123, 132
Fruit Varieties, New 174

Gamble, Dr. James A. 138
Garden, A Fragrant for the Blind* 33-35, 53
Garden Club of America Award to Dr. Robbins 136
Garden Club of New Jersey Flower Show School 176
Gardening with Potted Plants* 44-45, 53
Gardening Work, Some Fall* 160-162
Gardens and Gardeners, A Visit to California* 144-147, 163
"Geraniums for Home and Garden" inside back cover, Jul.-Aug.
Gift to Laboratory 29
Gifts to the Garden 66
"Golden Jubilee Merit Citations" 29
Graduates at the Garden, Reception for 173
Greenbrook, September Patterns at* 198-201
Greenhouses, Plastic for Home Gardeners* 56

Hedges, Trimmed* 92-94
Hicks, Dr. Lawrence Emerson 100
Horticultural Society of New York, Annual Awards 67
Houghton, Mrs. Clement S. 30
House Plants, Begonias are Fascinating* 7-9, 12, 13
House Plants, Three Easy* 10-12
How to Transplant* 87-89

International Flower Show 100
Iris Garden, The Cedar Brook Park* 76-77, 81, 95
Iris, the Spuria* 15, 19
Irises, New Things in Dwarf Bearded 148-150
Ivy, Dwarf English* 82-83

John Bartram and Thorndon Park 141-143, 152, 189-191

Keck, Dr. David D. 209

Laboratory, The New York Botanical Garden* 156-159
Lawn-Boy 101
Let There Be Herbs 32, 68, 104, 140, 176, inside back cover, Sept.-Oct., 211-212
Lilac Arboretum, Ewing Park* 119-121
Lilacs, The Better 180, 201, 212
Lilies—For Beauty* 109-112, 123
Linnaeus Anniversary 101
"Longwood Gardens" 166-168
Lord & Burnham Company of New York 68

Maguire, Dr. Returns from Abroad 29
Maitland, Mrs. James 138
Maxwell, Mrs. Howard W., Jr. 67
"Men and Gardens"— a Review 197, 212
Milbert, J. G. 105-108, 123, 132
Miniature Roses* 20-23, 46-48, 52-53
Modern Rose Pruning 83, 86, 94
"Mount Vernon" 202-203
Mounting Seaweeds 176
Mulches and Fertilizers for Rhododendrons 43, 56-57, 60-62, 80-81
My Experience with Japanese Chrysanthemums* 24

National Capitol Flower Show Visited 101
National Chrysanthemum Society, Fourteenth Annual Show 176
Nehrling, Arno H. honored 137
New Jersey Bonsai* 13-14
New Rhododendron Horizons* 78-80
New Things in Dwarf Bearded Irises 148-150
News, Notes and Comments 27-30, 66-67, 68, 100-103, 135-138, 173-174, 209-211

1958 All-America Rose Selections 66

Orchid Congress, Second Eastern 101
"Order of the Green Thumb" 174
Other Gardens 205
Outdoor Chrysanthemum Culture* 153-155, 170-171, 184-186, 192, 196-197

Peony, Hybrids, Saunders* 84-86, 116-118
Perennials, Today's Better* 181-183
Place, Angela Moore 135
Plant Notes, Some* 114-115
Plastic Greenhouses for Home Gardeners* 56
Potted Plants, Gardening with* 44-45, 53
President's News Letter 135, 209
Pruning Pointers, Tree* 16-18
Pyne, Mrs. Grafton H. 211

Recent Acquisitions to the Library inside back cover, Jul.-Aug.

Reception for Graduates at the Garden 173
Research-Laboratory Building of The New York Botanical Garden, Dedication of 27
Rhododendrons, Mulches and Fertilizers for 43, 56-57, 60-62, 80-81
Rhododendrons, New Horizons* 78-80
Richmondtown Restoration* 73-75
Rickett, Dr. H. W., Honor to 66
Robbins, Dr. William J. 100
Robbins, Dr., Elected Trustee of Rockefeller Institute 30
Robbins, Dr., Garden Club of America Award to 136
Rogers, Dr., Honors to 66
Rose, A European Circuit* 39-41
Rose, a Lavender 211
Rose Day, Fifteenth Annual 100
Rose Pruning, Modern 83, 86, 94
Rose Selections, 1958 All-America 66
Roses — A Plant Doctor Grows* 113, 131-132
Roses in the Home Landscape 150, 163
Roses, Miniature* 20-23, 46-48, 52-53
Roses, the Irish Have a Way With 5-6, 14
Saunders Peony Hybrids* 84-86, 116-118
Schilling, Grace M. Retires 173
Second Eastern Orchid Congress 101
Seeds, Sowing in Flats* 50-52
September Patterns at Greenbrook* 198-201
Some Fall Gardening Work* 160-162
Some Plant Notes* 114-115
Something Old, Very New 29
Sowing Seeds in Flats* 50-52
Spring 1957 Garden Tour 137
Spuria Iris, The* 15, 19
Staff Changes 100
Stamps Portray Plant Life 66
Stout, Dr. Arlow B. 211
Stout, Dr. and Daylilies 136
Straus, Elizabeth Allen 135

The Better Lilacs 180, 201, 212
The Challenge of the Amazon Valley* 90-91, 95
The Editor Visits* 164-169, 202-205
The Garden's Seed Exchange 137
The Irish Have a Way with Roses 5-6, 14
The National Arboretum* 168-169
Thornton, Archie 211
Three Easy House Plants* 10-12
Today's Better Perennials* 181-183
Transplant, How to* 87-89
Tree Planting Project 174
Tree Pruning Pointers* 16-18
Trimmed Hedges* 92-94
Twenty-first Flower Show School, Garden Club of New Jersey 67

Vegetable Garden, A Home 100
Verdoorn, Frans 210
Vines* 151-152

Wayside Gardens 1958 Introductions 209
Wells, James S. 101
Winter Protection of Plants* 193-196
"Winterthur"* 164-165, 166

Yew, A Really Aged* 209
Youth Program at The New York Botanical Garden* 58-60

AUTHORS

Albert, Allen D., Jr. 83, 86, 94
Allard, Harry A. 82-83
Alley, Francis A. (rvw.) 133
Anchel, Marjorie (rvw.) 98
Anderson, A. W. (rvw.) 25
Annese, Domenico 73-75
Anthony, R. D. 187-188
App, Frank (rvw.) 97

Baldsiefen, Warren 43, 56-57, 60-62, 80, 81
Baldwin, J. T., Jr. (rvw.) 140
Barneby, R. C. (rvw.) 99
Barry Florence D. (rvw.) 99
Bartley, Floyd 101
Bayles, Vera T. (rvw.) 64
Beale, J. H. (rvw.) 134
Bear, Firman E. (rvw.) 140,
Bechtel, Edwin De T. 39-41
Borin, John G. (rvw.) 65
Boxman, W. H. (rvw.) 175
Bratter, Edward M. (rvw.) 64; (rvw.) 96
Bridge, Samuel F., Jr. (rvw.) 30
Button, Romaine F. (rvw.) inside back cover, March-April

Cain, John C. (rvw.) 32
Cain, Stanley A. (rvw.) 25
Capreal, Mary F. (rvw.) 104, 162-163
Capreal, Spencer Harrison 153-155, 170-171, 184-186, 192, 196-197
Carleton, R. Milton (rvw.) 64
Cattell, Mary Deputy (rvw.) 64
Clark, William J. (rvw.) 172
Clum, Harold H. (rvw.) 65
Coggeshall, Roger G. (rvw.) 134
Cole, Peggy B. (rvw.) inside back cover, Nov.-Dec.
Conners, Charles H. (rvw.) 98
Coulter, F. C. (rvw.) 207
Cowan, Richard S. (rvw.) 26; (rvw.) 133; (rvw.) 171; (rvw.) 206
Cronquist, Arthur (rvw.) 25; (rvw.) 171
Cumming, Roderick 181-183
Cutting, Stephen G. (rvw.) 175
Cyphers, Emma Hodkinson (rvw.) inside back cover, Nov.-Dec.

Davidson, Roy 148-150
De Coursey, Marian W. 7-9, 12, 13
Dodds, Robert E. (rvw) 97
Drew, May Taft (rvw.) 97
Dustan, Alice L. (rvw.) 63

Emmert, E. M. 56

Everett, T. H. 16-18, 50-52, 87-89, 114-115, 160-162, 193-196

Filmore, Richard H. (rvw.) 65
Foster, Gertrude B. 32, 68, 104, (rvw.) 133, 140, 176, inside back cover, Sept.-Oct., 211-212
Fox, Gertrude (rvw.) 103
Fox, Helen M. 144-147, 163
Frese, Paul F. (rvw.) 207

Gabrielson, Ira N. (rvw.) 172
Greiff, Victor (rvw.) 98; (rvw.) 206
Gross, George C. 140
Gross, Louis C. (rvw.) 30
Gunnison, Olive M. (rvw.) 139

Hansell, Dorothy Ebel 164-169, 202-205
Harrington, Gove B. (rvw.) 31
Heard, Clyde H. 180, 201, 212
Hodge, W. H. 124-128, 131
Hogner, Dorothy Childs (rvw.) 25
Holton Louise D. (rvw.) 64; (rvw.) 97
Houskeeper, Rose B. 13-14
Hunt, Rachel McM. M. (rvw.) 208

Ishizu, William K. (rvw.) 24

Kazimiroff, Theodore (rvw.) 208
King, Arthur W. (rvw.) 134
Klein, Richard M. (rvw.) 176
Kolaga, Walter A. (rvw.) 26
Kurtz, R. B. (rvw.) 26

Landes, Karl H. (rvw.) 104
Lasker, Anabel Combs (rvw.) 26
Lindo, Irene 103
Lloyd, Edward B. inside back cover, Nov.-Dec.

Martin W. P. (rvw.) 139
McGredy, Sam 5-6, 14
McNeill, Florence S. (rvw.) 99
Menninger, Edwin A. (rvw.) 98
Mogford, Georgian (rvw.) 96
Moldenke, Alma H. (rvw.) inside back cover May-June
Moldenke, H. N. (rvw.) 26; (rvw.) 206
Mulligan, B. O. (rvw.) 96

Nordine, Roy M. 92-94

Olive, Lindsay S. (rvw.) inside back cover, Nov.-Dec.
Ortmeyer, Muriel (rvw.) 174-175

Pinney, Margaret 20-23, 46-48, 52-53
Pirone, P. P. (rvw.) 31
Place, Angela Moore (rvw.) 63
Prince, Winifred Notman 141-143, 152, 189-191
Purnell, W. F. (rvw.) inside back cover Mar.-Apr.

Richardson, Don (rvw.) 96
Rickett, Harold W. 177-179, 197, 205, 212
Robbins, William J. 1-4, 14, 36-38, 41, 42, 69-72, 75, 105-108, 123, 132
Roberson, Frances Kinne (rvw.) 98
Roche, Mary Alice (rvw.) 99
Ross, Merry Ellen (rvw.) inside back cover, Jul.-Aug.
Rothman, A. D., 109-112, 123

Sandahl, Paul L. 119-121
Saunders, Silvia 84-86, 116-118
Schread, John C. 49
Shammarello, A. M. 78-80
Skinner, Henry T. (rvw.) 26
Slate, George L. (rvw.) 31
Smith, Kenneth D. 54-55
Stern, William Louis (rvw.) 172
Swanson, C. L. W. (rvw.) 32
Swift, Howard W. (rvw.) 63; (rvw.) 176, 198-201

Taylor, Bryan 150, 163
Taylor, Kathryn 44-45, 53
Taylor, William Randolph (rvw.) 208
Thomson, Richard (rvw.) 103
Tickner, Herbert W. (rvw.) 134
Tiffney, Wesley N. (rvw.) 206

Walker, Marion R. 15, 19
Wells, James S. (rvw.) inside back cover, Nov.-Dec.
Westcott, Cynthia 113, 131-132
White, Rose B. 122-123
Wihtol, Marjorie 10-12, 68, 151-152
Williams, Frances R. 176
Wilson, Lois 33-35, 53
Wilson, Ruth E. (rvw.) 208
Wing, Andrew S. (rvw.) 207
Wister, John C. 76-77, 81, 95
Woodle, Hugh A. (rvw.) 140
Wright, Murray 42-43
Wurdack, J. J. (rvw.) 65; 90-91, 95, 129-131

Zimmerman, P. W. (rvw.) 65

PLANTS

Abelia 134
Abies 1, 72
balsamea 143, *homolepis* 14
Acer 72
Lobelii 1, *macrophyllum* 72, *pensylvanicum* 143, *rubrum* 72, *saccharum* 72
Achillea filipendulina 181
Agrostis stolonifera 108
Ajuga reptans 150
Allium ascalonicum inside back cover, Sept.-Oct. *trioccum* 105, *tuberosum* 176, *Scorodoprasum* 176
Alnus 72
Aloysia triphylla 26
Alyssum maritimum 115
Amelanchier canadensis 143
Ananas sativus 101
Angelica Archangelica 104
atropurpurea 104
Apocynum 108
Aquilegia 14
canadensis 205
Arctostaphyllos Hookeri 146
insularis 163, *Uva-ursi* 163
Aristolochia elegans 152
grandiflora 151
Artemisia pycnocephala 146
Araucaria excelsa 1
Arbutus Menziesii 14
Argyroxiphium gymnoxiphium (Gray) Keck 29
Arundinaria 124, 127
amabilis 127, *Simonii* 127
Asaron canadense 105
Asarum canadense 105
europaeum 182
Asclepias 108
Asperula 14
Aster Douglasii 182
novibelgii 182
Aubretia 150
Azalea calendulaceum 205
nudiflorum 205, *roseum* 205
Azorella 14

Bambusa 124, 127
Begonia aconitifolium 7
alnifolia 13, *Boweri* 9, 12, 13, *Bunchii* 13, *cheimantha* 12, *coccinea* 12, 68, *Crestabruchii* 12, *Croftoni* 12, *dichroa* 9, 13, *Digwilliana* 12, *Dregei* 12, *Drosti* 12, *erythrophylla* 12, *erythrophylla helix* 12, *Evansiana* 8, *floribunda rosea* 12, *fuchsioides* 7, *Hugelii* 12, *illustrata* 12, *incana* 12, *incarnata* 12, *Kellermannii* 12, *Limminghei* 12, *Lucerna* 13, *maculata* 12, *manicata* 12, *manicata aureo-maculata* 12, *Melior* 12, *Mazae* 13, *nitida* 12, *nitida* var. *odorata* 12, *oadi* 12, 68, *odorata alba* 68, *phyllomaniaca* 12, *picta rosea* 12, 68, *Preussen* 13, 68, *prunifolia* 12, *Rex* 12, *Roezlii* 13, *rosea gigantea* 12, *Rossii* 13, *rubra* 12, *rubra odorata* 12, *Scharffii* 9, 13, *Schmidtiana* 13, *semperflorens* 13, 206, *socotrana* 8, *subvillosa* 12, *Sunderbruchii* 12, *Templinii* 12, *venosa* 13, *viau-Scharff* 13, *viaudi* 13, *weltoniensis* 13
Beloperome guttata 101
Berberis mentorensis 93
Nevinii 146, *Thunbergii* 93, *Thunbergii atropurpurea* 93, *Thunbergii atropurpurea nana* 93, *Thunbergii erecta* 93
Bergenia 150
Boletus edulis 38
Bougainvillea 144
Bowiea (Schizobasopsis) volubilis 151
Buckleya distichiophylla 3
Buddleia 1
Davidii 193
Buxus microphylla koreana 94

Camellia sasanqua 169
Carpenteria californica 163
Carpinus Betulus 93
Carya 72
cordiformis 72, *ovata* 72
Ceanothus cyaneus 163
glorious 163, *impressus* 163, *megacarpus* 163, *thyrsiflorus* var. *griseus* 163, *tomentosus* 163
Cedrus atlantica 169
atlantica aurea 14, *atlantica glauca* 164, *libani* 169
Celtis occidentalis 143
Cephalostachyum 124, 127
Cercis canadensis 143
Ceropegia Gardnerii 151
Sandersoni 152
Chamaecyparis thyoides 94, 143
Chaenomeles lagenaria 93, 140
Chimonobambusa 124
Chionanthus virginiana 205
Chionodoxa 43
Chrysanthemum indicum 24
morifolium 24, *nipponicum* 115
Chrysogonum virginianum 205
Cissus 152
discolor 152
Cobaea scandens 152
Columnea 168
Commelina sativa 206
Cornus florida 1, 49, 72, 143
mas 93, *officinalis* 93, *stolonifera* 143
Correa 45
Cotoneaster acutifolia 93
Crataegus 72
crus-galli 143
Cryptomeria japonica 169
Cupressus 72
glabra 72
Cyclamen 43
Atkinsii 45, *cilicicum* 45, *coum* 45, *libanoticum* 45, *neapolitanum* 45, *repandum* 45
Cytisus Beanii 163
canariensis 144, *kewensis* 163

Daphne 14
odora 45
Datura Mollis 167
Dendrobium Cunninghamii 25
Dendrocalamus 127
Dendromecon rigida 144
Dianthus 14, 181
Dioscorea 83
Diospyros virginiana 72
Dipladenia 152
Dothidella ulei 90
Draba 14

Echinochloa polystachya var. 91
Epigaea repens 205
Eranthemum 53
Eriogonum fasciculatum 163
giganteum 163, *rubescens* 163, *saxatile* var. *crocatum* 163

Eucalyptus 169, 182
Gunnii 14
Eugenia 98
Euonymus alatus 93
Fortunei Carrierei 93, *Fortunei vegetus* 93
Euphorbia Bergeri 122, 123
Caput-Commelinii 122, *Caput-Medusae* 122, 123, *Caput-Medusae* var. *major* 122, *Caput-Medusae minor* 122, *leucacephala* Lotsy 103, *obesa* 122, 123, *similans* 122

Fagus grandifolia 72
Ficus pumila 152
repens 152
Fragaria chiloensis 144, 146
Fraxinus 72
Fremontia 144
californica 163, *mexicana* 163
Fuchsia denticulata 163
exorticata 25
Gaylussacia baccata 205
Gelsemum 144
Gentiana inverleith 14
Geranium Endressi 'Wargrave Pink' 210
Gerbera 53
Gigantochloa 127
Guadua 127

Hamamelis virginiana 205
Hebe elliptica 150
Hedera 1, 36
helix 82, 83, 114, 144, *helix baltica* 82, *helix* 238th Street 82, 83, *helix hibernica* 114, *helix* var. *arborescens* 1
Helichrysum 14
Hemerocallis 182
fulva 136
Hevea 90
Hosta lancifolia 183
plantaginea 183
Hoya carnosa 152
Hymenachne amplexicaulis 91
Hymenaea courbaril 90

Iberis sempervirens 114
Iboza 53
Ilex aquifolium 169
crenata 14, *opaca* 94, 169
Impatiens 44
Iris 76
arenaria 148, 149, *attica* 148, *atroviolacea* 149, *azurea* 149, *Bloudowii* 148, *bucharica* 77, *Chamaeiris* 148, 149, *cristata* 77, *danfordiae* 77, *dichotoma* 77, *Douglasiana* 146, *fimbriata* 145, *flavissima* 148, *gatesi* 77, *gracilipes*, 77, 81, *histrioides* 77, *hoogiana* 77, *innominata* 146, *italica* 148, *korolkowi* 77, *mellita* 148, 149, *olbiensis* 148, *pseudopumila* 148, *pumila* 148, 149, *reticulata* 43, 77, *Reichenbachii* 148, rubromarginata 148, *sub-biflora* 148, *susiana* 77, *tectorum* 77, *vicaria* 77, *Willmottiana* 77

Jasminum nudiflorum 45
Juglans nigra 72, 143
Juniperus chinensis Pfitzeriana 94
squamata prostrata 114, *virginiana* 72

Kalmia latifolia 143, 205
Kolkwitzia amabilis 93

Lagenaria leucantha 206
Larix laricina 143
leptolepis Kurlensis 14
Leersia hexandra 91
Leptospermum scoparium var. *rubrum* 145
Ligustrum amurense 93
vulgare 93, *vulgare nanum* 93
Lilium 109
amabile 110, *amabile luteum* 110, *auratum* 111, *aurelianense hybrids* 110, *Brownii* 111, *callosum* 110, *canadense* 112, *candidum* 110, *Catesbaei* 111, *centifolium hybrids* 110, *concolor* 110, *dauricum* 110, *Davidii* var. *Willmottiae* 110, *formosanum* 110, *Grayi* 112, *Hansonii* 110, *Hansonii x Martagon* 110, *harrisianum* 112, *Henryi* 110, *japonicum* 111, *Kelloggii* 112, *lankongense* 111, *longiflorum* 110, *michiganense* 112, *myriophyllum* x *Havemeyer* 110, *nepalense* 111, *pardalinum giganteum* 112, *Parkmannii* 111, *philadelphicum* 112, *pyrenaicum* 111, *regale* 110, *rubellum* 111, *rubrum* 112, *Sargentiae* 110, *speciosum rubrum* 110, *sulphureum* 110, *superbum* 112, *Szovitsianum* 111, *tsingtauense* 110, *umbellatum* 110, *Washingtonianum purpurescens* 112
Liquidambar Styraciflua 72
Liriodendron tulipifera 72, 143
Liriope Muscari 114
Lobularia maritima 115
Lonicera Claveyi 93
Luziola spruceana 91
Lycaste Skinneri 101

Magnolia acuminata 72
grandiflora 115, *virginiana* 143
Malus baccata 187
Eleyi 188, *floribunda* 188, *prunifolia* 188, *purpurea* 188, *Sargentii* 188, *Sieboldii* 188, *torengoides* 188, *Zumi* 188
Manettia bicolor 151
Maurandia Barclaiana 151
Meconopsis 14
Menyanthes trifoliata 108
Metasequoia glyptostroboides 169
Moltkia 14

Narcissus bulbocodium 43
Tazetta 161, *triandrus* 43
Nothofagus 25
Nyssa sylvatica 72

Ophiopogon Jaburan variegatus 114
Orontium aquaticum 115
Oryza alta 91
perennis 91
Osmanthus ilicifolius 204

Paeonia 118
albiflora 116, 117, 118, *chinensis* 116, *Coriacea* 118, *Delavayi* 85, 86, *Emodi* 118, *Forrestii* 85, *lactiflora* 116, *lobata* 117, *Ludlowi* 86, *lutea* 85, 86, 116, 118, *macrophylla* 117, 118, *Mlokosewitschii* 117, 118, *moutan* 84, *officinalis* 116, 117, 118, *Potanini* 85, *sinensis* 116, *suffruticosa* 84, *tenuifolia* 117, 118, *trollioides* 85, *Wittmanniana* 117, 118
Panicum chloroticum 91
elephantipes 91
Paspalum fasciculatum 91
Paullinia cupana ssp. *sorbilis* 91
Pelargonium inside back cover Jul.-Aug.
domesticum inside back cover Jul.-Aug.
peltatum inside back cover Jul.-Aug.
Penstemon 182
grandiflorus x *Murrayanus* 182
Peperomia 8
Phlox 181
carolina 181, *divaricata* 150, 181, 191, *glaberrima* 181, *ovata* 181, *paniculata* 181, *pilosa* 181, *pulchra* 181, *stolonifera* 150, *subulata* 150, 181,
Photinia (Heteromeles) arbutifolia 163
Phyla lanceolata 26
nodiflora var. *rosea* 26
Phyllostachys 124, 127, 128
aurea 127, *aureosulcata* 124, *bambusoides* 128, *makinoi* 128, *Meyeri* 127, *monogynus* 93
Physocarpus opulifolius 205
Picea pungens Kosteriana 14
Pinus Laricio 71
resinosa 43, *Strobus* 35, 43, 60, 72, 94, *sylvestris* 71, *taeda* 72
Plumbago 44
Populus 72
x *euramericana* 71
Poterium spinosum 206
Primula malacoides 45
Prunus pensylvanica 143
serotina 143
Pseudosasa 124, 127
japonica 124
Punica Granatum var. *nana* 10

Quercus sp. 72
borealis 71, *coccinea* 143, *dumosa* 163, *ilicifolia* 71, *imbricaria* 72, *macrocarpa* 42, *palustris* 72, *pontica* 75, *rubra* 72, *sessiliflora* 71, *velutina* 71, *virginiana* 143

Rhamnus cathartica, 93, 146
Rhododendron brachycarpum 79
calendulaceum 61, *caroliniana* 165, *catawba* 168, *catawbiense* 78, 79, 205, *catawbiense* 'Glass' 79, *ledifolia alba* 165, *luteum* 168, *Mariesii* 168, *mucronulatum* 165, *mucronulatum magnificum* 165, *ovatum* 168, *reticulatum* 168, *Schlippenbachii* 165, 168, *Smirnowii* 78, 79, *Smirnowii-catawbiense* hybrids 168
Rhus integrifolia 163
laurina 163, *ovata* 163
Ribes alpinum 93
malvaceum 146, *sanguineum* 146, *speciosum* 146, *viburnifolium* 163
Ricinus communis 206
Rimu 25
Robinia hispida 143
Pseudo-Acacia 42, 205
Rosa canina 41
chinensis minima 22, 46, 47, *cinnamomea* 6, *foetida* 6, *indica pumila* 48, *Laurentiae* 48, *Lawrenciana* 48, *magnifica* 40, *multiflora* 41, 93, *multiflora nana* 21, *polyantha nana* 20, 48, *pumila* 21, *rugosa* 6, *Roulettii* 20, 21, 23, 46, 47, 48, 52, *semperflorens minima* 48, *spinossissima* 41, *Wichuraiana* 21, 22, 48
Rosmarinus Lockwoodi 145
repens 145

Salvia apiana 163
Clevelandii 163, *mellifera* 163
Sarracenia 105
Sasa 124
Sassafras albidum 72
Saxifraga sarmentosa 8
Sedum maximum var. *atropurpureum* 181
Nevii 205
Semiarundinaria 124, 127
Senecio aureus 205
laxifolius 150, *mikanioides* 151
Sequoia gigantea 1
sempervirens 14
Sequoiadendron giganteum 72, 75
Shibataea 124
Shortia galacifolia 205
Sinobambusa 124
Sobralia macrantha 103
Solanum 144
Sophora japonica 42
Sparmannia 53
Spiraea Bumalda 94
japonica ovalifolia 94, *multiflora arguta* 94
Spironema fragrans 12
Swainsona 53
Synadenium Grantii 122
Syringa amurensis 180
chinensis 180, *japonica* 180, *microphylla* 180, *oblata* 180, *pekinensis* 180, *persica* 180, *pubescens* 180, *rothomagensis* 180, *vulgaris* 93, 180

Tamarix mannifera 206
Taxodium ascendens 72
distichum 72, 75
Taxus 1
cuspidata 94, *media Hicksii* 94
Teucrium Chamaedrys 93
fruticans 144
Thuja 3
occidentalis 94, *plicata* 72
Thunbergia grandiflora 53
Tibouchina 44
Tradescantia foliosa 12
Trichostema lanatum 146, 163
Triodia flava 108
Tsuga canadensis 94, 143
Tulipa Fosteriana 42
Kaufmanniana 42
Umbellularia californica 163
Urtica 108

Vaccinium angustifolium var. *laevigatum* 205
stamineum 205
Veronica holophylla 183
longifolia var. *subsessilis* 'White' 183, *spicata* 'Minuet' 183
Viburnum 169
Carlcephalum 53, *Carlesii* 53, *dentatum* 94, *Lantana* 94, *Lentago* 94, *Opulus* 94, *Opulus nanum* 94
Vinca major 144
Vitis 152
Voinieriana 151

Yerba buena 147
santa 147
Zenobia 134

ILLUSTRATIONS

Alyssum maritimum 115
Apple 179
Argyroxiphium gymnoxiphium (Grey) Keck 29
Artemisia 'Silver Mound' 182
Asaron (Asarum) canadense from Cornuti, *Canadensium Plantarum,* etc. 107

Bamboo 124, 125, 126, 128
Bechtel, Edwin De T., and Mrs. John Sluder 135
Begonia exhibit 19
Begonia 'Annabelle' 7
Boweri 9, *prunifolia* 7, 'Sir Percy' 8, 'Thrush' 9
Black pepper bushes 90
Botanical Garden at Meise, Belgium 36
Botanical Garden at Meise, Belgium, plan of 37
Bulbs in Pebbles 161-162
Bundesgarten, Tassel, Hesse 40

Chrysanthemum 'King's Ransom' 183
'Lady Fair' 183, *nipponicum* 115, 'Taiko Kobar' 24
Chrysogonum virginianum 139
Colloque International 69, 70, 71, 72
Crabapple, Asiatic 187
Cyathea medullaris 144

Darwin, Charles, study at Down House 4
Detmer's Arboretum 138
Dogwood borer 49
"Devon House" of Mrs. C. Vernon Lindo 102
Dianthus 'Pink Princess' 181
"Dumbarton Oaks" 204

Euonymus alatus 92
Euphorbia Bergeri 122
Caput-Medusae, arm cutting of 122, *Caput-Medusae*, normal plant 122, *Caput-Medusae*, three-year old seedling 122
leucocephala Lotsy 103
Everett, T. H. and James Wells 101
Ewan, Dr. Joseph 38
Ewing Park Lilac Arboretum 120

"Fieldston Hill" 137
Floradale Farms, Lompoc, Calif. 146
Forage grasses and legumes, test plots of 91

Garden for blind 34, 35
Greenbrook Sanctuary 198, 199, 200
Guaraná 90

Hedera helix 82-83, 114
leaves of 83
var. *arborescens* 2
Heeling in 160
Helleborus niger 139
Hescock, Mrs. Milton A. 136
Hobby Club Room, The New York Botanical Garden 57
"Hudson Pines" 137

Iberis sempervirens 114
Iris cristata 139
'Harriette Halloway' 77
'Morningtide' 15
'Vicaria' 81
Iris Garden in Cedar Brook Park, Plainfield, N. J. 76,77
Ivy, Dwarf English 82-83

Junipers in the manner of Bonsai 13
Juniperus squamata prostrata 114

Keukenhof Bulb Garden, Lisse, Holland 42-43
Kordes, Wilhelm 40

Laboratory, The New York Botanical Garden 156, 157, 158, 159
"Laurel Hill" 139
Lilac Arboretum, Ewing Park 120
Lilium auratum 111
Parkmannii 'Jillian Wallace' 109
pitkinense 110, *Sargentiae* 111
Lilies 209
Lily bulbs 112
Lily 178
'Electra' 110, Pfeiffer Hybrid 110
Liriope Muscari 114
Lobularia maritima 115
"Longwood Gardens" 166, 167
Lonicera Claveyi 92

Magnolia 179
grandiflora 115
Malus atrosanguinea 188
baccata mandschurica 188, *hupehensis* 188
Martius Relic 131
Moore, Ralph S. 48
Morton Arboretum, Hedge Collection 92
Mount Vernon 202, 203

Narcissus 'Arbor' 54
'Empress of Ireland' 55, 'Salmon Trout' 55, 'Tudor Minstrel' 54
National Arboretum 168-169

Oak, English 3
Orontium aquaticum 115

Paeonia Mlokosewitchii 117
Parc de la Grange, Geneva, Switzerland 41
Peony hybrid 'Canary' 84
Japanese tree 85, Japanese tree 'Seiriu' 84, 'Lady Gay' 116, 'Queen Rose' 116, Saunders lutea hybrid 'Coroval' 84
Petunias at Floradale Farms 147
Philipse Castle 138
Phyllostachys bambusoides 127, 128
nigra 124
Physocarpus monogynus 92
Pirone, P. P., and Westcott, Cynthia 113
Pit house 44
sun-heated 45
"Planting Fields" 210
Punica Granatum var. *nana* 10

Rhododendron 'Boule De Neige' hybrid 78, *catawbiense* hybrid 78, *Cunninghami* hybrid 80, *Smirnowii* hybrid 79
Richmondtown Restoration 73, 74
Robbins, Dr. William J. 70, 71, 100
Robbins, W. J., Mrs. Harold I. Pratt, Dr. Detlev W. Bronk, Hon. Thomas C. Desmond on tour of inspection of new Laboratory-Research Building 28
Root cuttings 161
Rose 177
'Humpty Dumpty' 22, 'Jack Horner' 22, 'Jackie' 21, 'Marr' 23, 'Miss Muffet' 23, 'Pink Cameo' 47, 'Tommy Tucker' 48, 'White Night' 66
Rosery at Bagatelle, Paris 41

Santarem, Brazil 129, 130, 131
Saunders, Dr. A. P. 118
Schilling, Grace M. 173
Sedum maximum var. *atropurpureum* 182
Sowing Seeds in flats 50, 51, 52
Spironema fragrans 10, 11
Syringa oblata dilatata 119
Tetrapanax papyrifera 145

"Thorndon Hall" 189
Transplant, How to 87, 88, 89
Tree Pruning Pointers 16, 17, 18
Tsuga canadensis 92

Vegetable Garden of The New York Botanical Garden at International Flower Show 101

Westcott, Cynthia and Dr. P. P. Pirone 113
Winter protection 193, 194, 195, 196
"Winterthur" 164, 165
Wisley, dormitory for student-gardeners 2

Yew, Ceasar's, at Lo in West Flanders 209
Youth Program, The New York Botanical Garden 58, 59, 60

BOOKS REVIEWED

Adriance, Guy W. and Fred R. Bryson. Propagation of Horticultural Plants 65
Alexander, Gordon. General Biology 65
Anderson, A. W. Plants of the Bible. 206
Anderson, Harry Warren. Diseases of Fruit Crops 172
Angier, Bradford. Living Off the Country 133
Archer, Sellers G. Soil Conservation 65
Ashberry, Anne. Miniature Flowers and Vases 64

Barrett, Mary. Common Exotic Trees of South Florida 25
Bennett, H. Commercial Waxes 32
Billington, F. H. Compost for Garden Plot or Thousand-acre Farm 140
Blowers, John W. Orchid Growing 96
Bowers, N. A. Cone-Bearing Trees of the Pacific Coast 96
Broekel, Ray. You and the Sciences of Plants, Animals and the Earth 175
Brooks, Myra J. with Mary Alice and John P. Roche. The Magic World of Flower Arranging 99
Brown, Relis B. Biology 104

Carr, Rachel E. A Year of Flowers inside back cover Mar.-Apr.
Cathey, Cornelius Oliver. Agricultural Developments in North Carolina 1783-1860 96
Champneys, H. (edited by) Encyclopedia of Roses and Rose Culture 175
Chapman, A. G. and R. D. Wray. Christmas Trees for Pleasure and Profit 172
Chen, Philip S. Soybeans for Health, Longevity, and Economy 139
Chrisman, Irma. Christmas Trees, Decorations and Ornaments 103
Colby, C. B. America's Natural Wonders 174
Coon, Nelson. Using Wayside Plants 133
Cyphers, Emma Hodkinson. Foliage Arrangements 99

Dale, Tom and Vernon Gill Carter. Topsoil and Civilization 31
Darlington, C. D. Chromosome Botany 140
Davies, William C. New Zealand Native Plant Studies 25
de Ong, E. R. Chemistry and Uses of Pesticides 31
Dorf, Philip. Liberty Hyde Bailey 171
Douglas, Sholto. Hydroponics. The Bengal System 175
Dudley, Ruth H. Our American Trees 174

Eckbo, Garrett. The Art of Home Landscaping 64
Edmond, J. B., A. M. Musser, F. S. Andrews. Fundamentals of Horticulture Inside back cover Jul.-Aug.

Feininger, Andreas. The Anatomy of Nature 175
Felsko, Elsa. A Book of Wild Flowers 99
Fenton, Carroll Lane and Dorothy Constance Pallas. Insects and Their World 175
Fischer, George William and Charles Stewart Holton. Biology and Control of the Smut Fungi Inside back cover, Nov.-Dec.
Fitch, James M. and F. F. Rockwell. Treasury of American Gardens 63

Free, Montague. All About the Perennial Garden 63
Free, Montague. Plant Propagation in Pictures 208

Genders, Roy. Bedding Plants 134
Genders, Roy. Rock Gardening 26
Gladstone, Bernard. The Complete Book of Garden and Outdoor Lighting 31
Godwin, H. The History of the British Flora 25
Graham, Edward H. and William R. Van Dersal. Water for America. The Story of Water Conservation Inside back cover, Nov.-Dec.
Grant, Madeleine P. Wonder Wor' Microbes 175
Grigg, M. A. A New Course of Pla: Animals Inside back cover Mar.-

Hanley, John H. Year Round Garde: the West 97
Harada, Jiro. Japanese Gardens 64
Hardy, Alister C. The Open Sea 208
Hocking, George M. A Dictiona .f Terms in Pharmacognosy 104
Holmes, Roger and Paul Bailey. Fab ·us Farmer 134
Hottes, Alfred Carl. How to Incr ase Plants Inside back cover Jul.-Aug.
Hottes, Alfred Carl. The Book of Perennials Inside back cover, Jul.-Aug.
Hylander, Clarence J. The World of Plant Life 26

Jane, F. W. The Structure of Wood 172
Journal of Researches by Charles Darwin into the Natural History and Geology of the Countries Visited During the Voyage of H.M.S. Beagle Under the Comm d of Capt. Fitz Roy, R. N. 208

Kranz, Frederick H. and Jacque Gardening Indoors Under Lights
Krauss, Helen K. Geraniums for and Garden Inside back cover, J

Lamer, Mirko. The World Fertilize omy 140
Lane, Ferdinand C. All About the ing World 175
Lawrence, W. J. C. Soil Sterlization
Lebar, T. R. H. Dahlia Growing 9
Leeburn, M. E. Lilies and Their C tion 30
Levitt, J. The Hardiness of Plants 26
Loads, Fred W. Chrysanthemums Everyone 104
Luxton, George E. Flower Growing in North 63

McVaugh, Rogers. Edward Palmer. Plant Explorer of the American West 171
Milton, Abby. Flower Lore 64

Neal, Harry Edward. Nature's Guardians. Your Career in Conservation 171
Nichols, Beverley. Sunlight on the Lawn 208
1957 Yearbook Number of the Hemerocallis Journal 207
Noble, Mary and J. L. Merkel. Gardening in a Small Greenhouse 98
Norman, Charles. John Muir Father of our National Parks 207
Northen, Henry T. and Rebecca T. The Complete Book of Greenhouse Gardening 64

Ogden, Samuel. The New England Vegetable Garden 207

Peairs, Leonard Marion and Ralph Howard Davidson. Insect Pest of Farm, Garden and Orchard 31
Pearson, Haydn S. Country Flavor Cookbook 206
Piegelbeck, Will. The Complete Book of Gardening and Lawn Care 30
Platt, Rutherford. The River of Life 133

Rabinowitch, Eugene I. Photosynthesis and Related Processes 65
Ray, Carleton and Elgin Ciampi. The Underwater Guide to Marine Life 206
Reinfeld, Fred. Young Charles Darwin 26
Russell, Sir E. John. The Land Called Me. An Autobiography 97

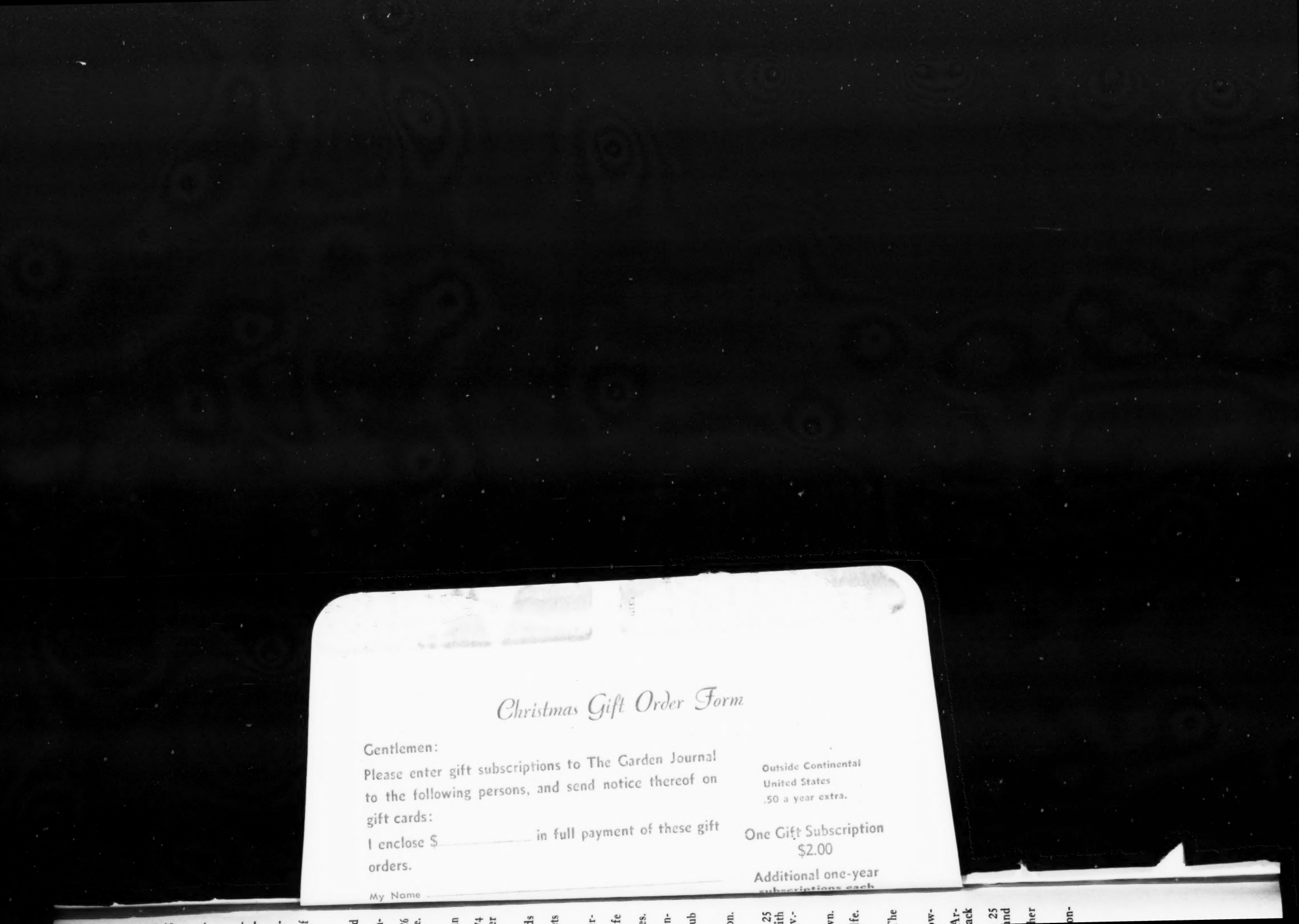
Sara Dorothy (editor). The New American Garden Book 176
Scheib, Ida. The First Book of Food 174
Schulz, Peggie. Growing Plants Under Artificial Light 98
Schwankl, A. What is That? 65
Stefferud, Alfred. The Wonders of Seeds 26
Stuebing, Emily. Arranging African Violets 98

Teale, Edwin Way. Autumn Across America 97
Temple, Vera. How to Draw Pond Life 96
Terrien, J., G. Truffaut, and J. Carles. Light, Vegetation and Chlorophyll 176
Teuscher, Henry. Window-Box Gardening 63
Thomas, Graham Stuart. The Old Shrub Rose 99
Thomas, Meirion. Plant Physiology 32
Tisdale, Samuel L. and Werner L. Nelson. Soil Fertility and Fertilizers 139

Vajda, Erno. Wild Flowers in Hungary 25
Van Rensselaer, Eleanor. Decorating With Pods and Cones Inside back cover, Nov.-Dec.

Wallace, Henry A. and William L. Brown. Corn and Its Early Fathers 206
Watkins, John V. and Herbert S. Wolfe. Your Florida Garden 133
Webster, Barbara. The Green Year 97
West, Erdman and Lillian E. Arnold. The Native Trees of Florida 98
Whitehead, Stanley B. Garden Roses 30
Whitehead, Stanley B. The Book of Flowering Trees and Shrubs 134
Wilson, Helen Van Pelt. The Flower Arrangement Calendar 1957 Inside back cover Mar.-Apr.
Wood, Serry. The Old Apothecary Shop 25
Wright, R. C. M. Plant Propagation and Garden Practice 134
Wyler, Rose. The First Book of Weather 174

Yanagisawa, Soen. Tray Landscapes (Bonkei and Bonseki). 96



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BOOK REVIEWS (from page 208)

on certain aspects of plant propagation in which he may become interested. And it is, therefore, with the greatest possible pleasure that I read through the book by Montague Free.

It is customary, I suppose, for a reviewer to look through the book with a critical eye to see if he can find something to criticize, for that is supposed to be his job. Being a commercial propagator, I read the book in one sitting, devouring all of the information avidly which it contained, and I emerged at the other end with an unbounded admiration and appreciation of the quality of this book. Even if I wanted to find some carping criticism, I could not do so, for the quality of the information and, in particular, the exceedingly high quality of the pictures which illustrate the various techniques described are above all criticism. In my opinion, this is a really first-class book, which should be on the shelves of any keen gardener. In fact, it should be on the shelves of any person generally interested in plant life, because it describes in clear, concise prose and pictures all of the fundamental principles of plant life and reproduction. I can not recommend the book too highly, for it is interesting, highly informative, and completely up-to-date on the latest techniques, including the use of constant and intermittent misting, polyethylene plastics, air layering, and similar innovations.

But, although the book covers these latest advances thoroughly and clearly, it does not neglect the many basic procedures which are the true groundwork of the successful plant propagator. There is an excellent chapter on seeds, followed by a good description of vegetative propagation from cuttings. Then this is dealt with more exhaustively in a complete chapter, followed by chapters dealing with bulbs, runners, layering, and finally the propagation of perennials. For those who are interested in grafting, this method of propagation is adequately covered, and last but not least, is an excellent chapter dealing with rooting mediums and propagation equipment.

If the Chinese proverb which says "one picture is worth a thousand words" is true, then this book is indeed a library in itself.

JAMES S. WELLS
Red Bank, N. J.

DECORATING WITH PODS AND CONES. Eleanor Van Rensselaer. 179 pages, illustrated (photographs by Blair Stapp); indexed. D. Van Nostrand Co., Princeton, N. J. 1957. $4.95

The primary purpose of this book is suggested in the editor's foreword and shown in the organization of text and illustrations. Briefly, this is to focus attention on the beauty in even the smallest products of nature and to encourage readers to become, like the author, aware of their decorative possibilities.

With pods, cones, burrs, seeds, berries, bits of bark, moss, and lichen, and other generally overlooked materials, Mrs. Van Rensselaer has fashioned decorative trees, swags, wreaths, wall plaques, corsages, place cards, tallies, and favors.

For the most part the plant material utilized is gathered on our West Coast, with where to find it and when and how to gather and preserve it important factors. But charts by which to identify various plant forms and a list of where much of it can be purchased are supplied to make the book practical and helpful to the reader in any locale.

In the course of ten chapters clear and concise directions are supplemented with numerous photographic reproductions and a few line drawings.

Perhaps something more might have been said of art principles, but in its specialty, this book is a good and useful one. In some respects it is even of unique importance as a contribution to literature dealing with plant materials as an art and craft medium. It seems to this reviewer that to read DECORATING WITH PODS AND CONES is to have one's imagination stimulated. The urge to try out the ideas presented becomes impelling.

EMMA HODKINSON CYPHERS
Clifton, N. J.

WATER FOR AMERICA. THE STORY OF WATER CONSERVATION. Edward H. Graham and William R. Van Dersal. 111 pages, illustrated. Oxford University Press, New York. 1956. $3.50

Here are the A.B.C.s of our national water story set forth in a text as clear and flowing as water in a well-managed stream, and illustrated copiously.

There are 111 pages numbered in this book. Of these, 53 are page-length discussions of basic aspects of the subject (sample topics, chosen at random: Water In The Ground, The Big Rivers, Drinking, Washing, Water Power, New Uses for Water, Water Rights, Drainage, Water Pollution...) and 53 are full-page photographs explaining, in visual terms, each aspect.

These brief pages yield, on close examination, a gratifying body of fact, leading one to suspect the simple, easy-going style covers up a great deal of thought-distillation on the part of the authors.

The authors quote an old folk saying, "You never miss water until the well runs dry" in pointing up the ever-present bogie of public apathy in dealing with our ill-recognized, although urgent water crisis. Obviously this book was conceived and written as a well-mannered attack on this lamentable inertia.

The expert hydraulical engineer, the geologist, and other water authorities need not consult this excellent little primer. But they may rejoice that it will find its way onto the shelves of high school and public libraries.

PEGGY B. COLE
Stony Brook-Millstone Watersheds Assn. Inc.
Pennington, N. J.

BIOLOGY AND CONTROL OF THE SMUT FUNGI. George William Fischer and Charles Stewart Holton. 622 pages, illustrated, indexed. Ronald Press, New York. 1957. $10

This could well be called a "Textbook of the Smut Fungi," for it is probably the most adequate general treatment of this group of fungi that has yet appeared. There are sections on life histories and parasitism, growth in culture, cytology, genetics, physiological specialization, host resistance, control practices, and other important subjects. Even such limited subjects as smut-eating insects and fungi parasitic on smuts are not overlooked. The book is exceptionally well illustrated and has an extensive bibliography. A key to the genera and a host family register are included. The discussion of sexuality still leaves in doubt the true nature of the so-called "multiple sex groups" in the smuts. It is fairly evident that factors for pathogenicity have sometimes confused the interpretation of mating types. Clearly, there is as yet no evidence of true homothallism (only occasional pseudohomothallism) in this group. The scant knowledge of nuclear cytology is apparent, the nuclei being discouragingly small for cytological observation. The low chromosome counts (mostly $n=2$) reported by a number of investigators are probably due to erroneous interpretations of telophase figures at meiosis.

This clearly written and well organized book will be an invaluable aid to anyone interested in any phase of ustilaginology and is indispensable to mycologists and plant pathologists for purposes of teaching, research, and field work.

LINDSAY S. OLIVE
Dept. of Botany
Columbia University

Dahlia Show. For the first time in forty-three years, the American Dahlia Society held its annual exhibition outside New York City. On September 14 and 15, 1957, the observation deck of the Newark Airport passenger terminal with a floor area of ten thousand square feet was completely filled with exhibits by a world-wide group of dahlia hobbyists—amateur and commercial. The Dahlia Society of New Jersey and the Irvington (N.J.) Dahlia Society were participating sponsors.

This Newark exhibition was truly international in scope—air express entries being made from Holland, England, and Belgium and roots having been sent from England to be grown in this country for the exhibitor and to be shown under his name. These roots, victims of the prolonged drought, failed to develop display form, but will be given another opportunity to be exhibited in 1958 when better growing conditions may be anticipated. Members of affiliated societies of the American Dahlia Society from Canada, South Africa, and Siberia attended this exhibition.

At this annual dahlia show the best of the new seedling varieties are exhibited and rated by veteran judges of the American Dahlia Society. A winning variety receives the Society's Gold Medal Seedling Award and the coveted American Home Achievement Medal presented by The American Home Magazine. The award this year went to an amateur dahlia grower, Frank Marker, of Layton, New Jersey, for his salmon-pink cactus dahlia 'Renee.' This winner was immediately secured by the Gamston Gardens of Westwood, N. J., for introduction in 1958.

In addition to Gamston Gardens of Westwood, N. J., commercial exhibitors represented by worthy displays and through the competitive classes were Ruschmohr Dahlia Gardens of Rockville Center, L. I., N. Y., and the Parrella Dahlia Gardens from the Bronx, N. Y.

The exhibition was closely watched by the officers of the Port of New York Authority, of the Newark Airport, and of the American Dahlia Society to determine the value of this experiment in holding flower displays at Newark and New York airports, where thousands of air-borne travelers, as well as friends and relatives who come to meet them, may see the blooms. With an attendance of over ten thousand passing through the turnstiles, there was no question but that this amazing display was really seen!

EDWARD B. LLOYD, *Secretary*
American Dahlia Society

Wayside Gardens

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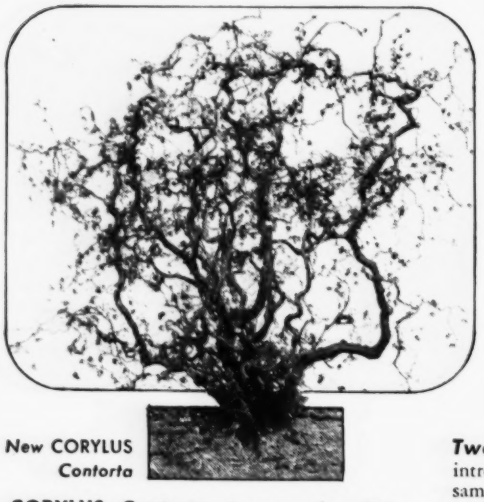

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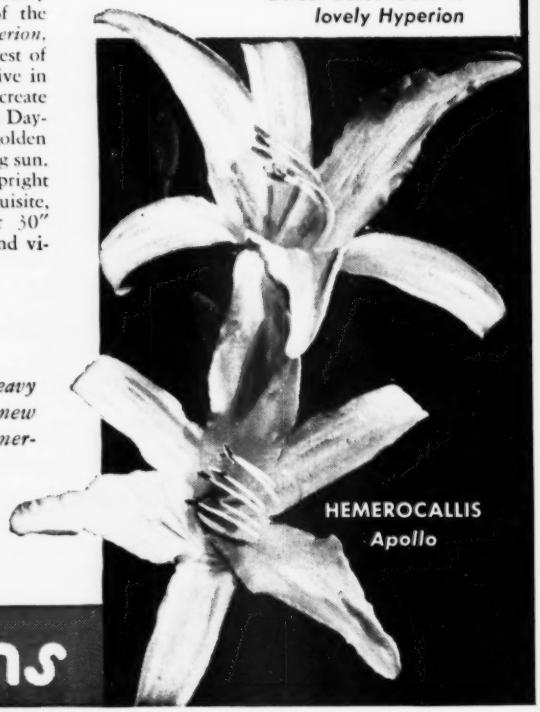

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